VOLUME XXXVIII | Established 1914 | NUMBER 4

CHEMICAL INDUSTRIES

APRIL, 1936

Consulting Editors

Robert T. Baldwin
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Frederick M. Becket
Benjamin T. Brooks
J. V. N. Dorr
Charles R. Downs
William M. Grosvenor
Walter S. Landis
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Milton C. Whitaker

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Publication Staff

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Publisher and Editor

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Walter J. Murphy
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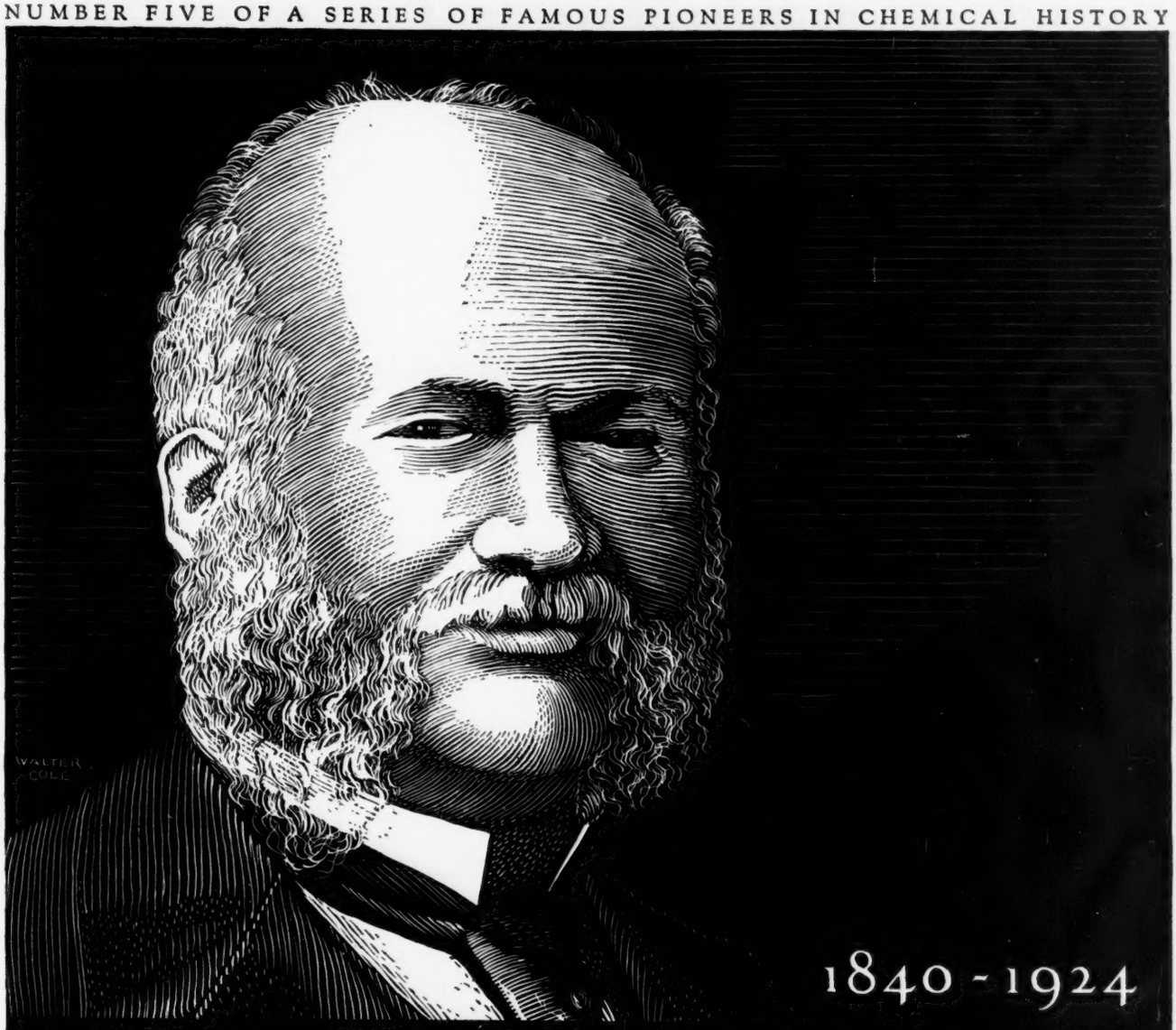
NUMBER FIVE OF A SERIES OF FAMOUS PIONEERS IN CHEMICAL HISTORY



1840 - 1924

HILAIRE DE CHARDONNET

PARIS was startled in 1889 to see for the first time a gown of man-made silk. The silk had been produced by Count Hilaire de Chardonnet and was such an impressive product that funds were readily obtained for the erection of the world's first artificial silk factory at Besançon, de Chardonnet's home town in northern France. From this pioneer venture, followed by other processes and by continuous improvement in product quality over the years, the giant rayon industry of today has developed. Consuming enormous tonnages of chemicals, rayon manufacture also demands chemicals of exceptionally high purity. Mathieson, pioneer producer of high purity caustic soda and other industrial chemicals, is proud of its part in helping to build this great industry.

In 1884, Hilaire de Chardonnet, a French nobleman, patented a process of manufacturing artificial silk in which nitrocellulose was forced through fine capillary openings. His discovery was not a matter of mere chance—it resulted from long study of ways and means of imitating the processes of the silk worm. De Chardonnet's successful and epochal work justly earned for him the title of "Father of the Rayon Industry."

The MATHIESON ALKALI WORKS (*Inc.*), 60 East 42nd St., New York, N.Y.

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The Reader Writes:—

New York Not New Jersey

In the January issue of your paper you have a news item headed "Direct Application of Carbon to Sewage." In this article is mentioned Newark, N. J., but your source of information was wrong; it should be Newark, New York.

New York City — Joseph M. Wafer, Industrial Chemical Sales Co., Inc.

A Step in the Right Direction

Our attention was recently called to the article in your January issue concerning, "How Not to Sell Packaged Plant Foods."

Strange as it may seem, the same mis-merchandising methods exist in Chicago. The florists and department stores are very reluctant about giving good plant foods a break. Fully comprehending this factor we are promoting a program to alter this situation.

We are introducing to the Chicago market at this time a new scientific plant food—"Plantamin A." It is different than any other plant food now on the market in these respects: (1) It does not need to be dissolved. (2) It does not require careful measuring of quantity. (3) There is no waste or injury if it is spilled. (4) Its slow decomposition makes feeding necessary only once a month. (5) The slow organic decomposition makes available to the plant a constant measured supply of nitrogen or the blossoming control element.

With these arguments in our favor and with careful placing of displays with show cards where they will be of some advantage, we will endeavor to change the aforementioned situation as it exists today.

If you have any extra copies or reprints of your article, a few may be of great help to us in our campaign.

Chicago, Ill. — Donald Dunn, Plantamin Laboratories.

Specialties to the Fore

Enclosed find check for two years' subscription. Your magazine is read extensively in the chemical specialties field. Would suggest if possible more articles on chemical specialty products. As a whole, the magazine is very good.

Detroit, Mich. — Sno-Flake Products Co.

Advice to T. V. A.

A few weeks ago the daily press reported testimony given by the experts of the Department of Agriculture who stated "It is improbable that the No. 1 plant can ever be operated again." This is the cyanamid plant, built at Muscle Shoals as a war measure, and is the only legitimate excuse for constructing the Wilson Dam. There was no advantage in putting a Haber plant there as it requires coal rather than much electric power for manufacturing ammonia.

The professed intention of the T. V. A. was to furnish cheap fertilizer and the only way it can be made at Muscle Shoals is by the cyanamid process, which may also produce ammonia and "Ammo-phos" in combination with the new electric phosphorus unit now operating there. All the plant and machinery is still there in operative condition unless destroyed by the T. V. A. While practically no cyanamid has ever been made in the U. S. much has been used as well as "Ammo-phos" easiest made from cyanamid. The electric turbines and plant have remained practically idle for over fifteen years while the Government has tried to sell surplus current at two mills per K.W.H. I am reliably informed that it would be possible now, simply by filling the furnaces with coke and lime and throwing the switch for the plant to fix nitrogen at 12,000 K.W.H. per ton which means $24.00 per ton at two mills per K.W.H. No other plant in the U. S. can fix nitrogen at this price. In the summer the minimum fixed power is about 50,000 K.W.H. At least 40,000 tons per annum could be produced for fertilizers.

When the pending war breaks out, it would be important as a war plant which the Supreme Court says was the original intention and that "surplus power can be sold."

The following clipping from Chemical Industries, Oct. '34, shows that the cyanamid process is not obsolete or "dead":

"Germany now holds an outstanding position in the world's output of cyanamid and of a total world productive capacity of cyanamid of 534,000 metric tons N, around one-third or 180,000 tons N is in Germany, according to the *Chemical Age*. Before the war Germany's cyanamid capacity amounted to only 10,000 tons but rose sharply during the war to 100,000 tons in 1918, to record still further appreciable expansion in the post-war period, and in 1933 German cyanamid works had a total capacity of 180,000 tons N. World consumption amounted to 178,014 tons in 1932-1933, compared with 144,668 tons in 1931-1932 and 217,935 tons in 1929-30. Germany has relatively the largest cyanamid consumption of any country."

Cyanamid output has increased since the war, as rapidly in proportion to the total as any other method of fixing nitrogen and Germany without any cheap water power has now one-third of the total world capacity. Canada has also increased the capacity built there since its pre-war capacity and this in the face of a large increase of cost of electric power.

Of course, no one would recommend that a new cyanamid plant be built, were there other uses for current. Our cheap coal allows the production of ammonia by the Haber process, unless cheap surplus power is available as at Wilson Dam. The large demand for fertilizers is in the spring and little is sold in summer. The surplus power begins after the fall rains and continues throughout the winter. During this time calcium carbide can be made in the electric furnaces and stored till spring when it can be converted into cyanamid for fertilizer or the ammonia recovered otherwise. This manufacture takes up the surplus power at the time it is produced by nature and it would otherwise go to waste. There is no other industry that can use surplus power for the six winter months and remain idle for the remainder of the year. Since capital has been spent for the cyanamid plant, it should be used rather than on "boondoggling" and impractical and uneconomical projects.

There has been a persistent propaganda due to sly German work as she wants no war industries built in other countries; and by those in the U. S. who fear that this plant will interfere with their dividends, but the later plants were built with the knowledge that this cyanamid plant might start up any time the Government should desire or allow it.

If we are to prevent the private exploitation of war munitions, it is very important that we have some reserves ready under Government control.

New York City. — H. O. Chute.

"Largely Twaddle"

I find Chemical Industries most informative of the chemical trade journals. Your special articles, patent information, and other monthly departments are always helpful. My only criticism is of your political editorials, which appear, to an outsider, to be largely twaddle.

Victoria, Australia — S. C. Orford, Federal Chemicals Pty. Ltd.

CHEMICAL INDUSTRIES

VOLUME XXXVIII NUMBER 4

Research Costs and Result Values

BOTH statisticians and salesmen have observed that the form and wording of a questionnaire have direct bearing not only upon the number of replies received, but also upon the completeness and accuracy of the information developed. Applying this same principle, Professor R. A. Fisher has been for several years working upon a practical scientific method whereby Nature will answer not a single question at a time, but will reply answers to a carefully thought-out questionnaire that will at once save costs of research, and yield more valuable results.

His painstaking investigations have recently been published in England entitled "The Design of Experiments". The book, though no formidable tome, is very solid reading. It has a mathematical approach, and its 252 pages bristle with the professional statistician's technical terminology. Moreover, its examples are chiefly from the agricultural and biological fields. Nevertheless, chemical executives and directors of research will be well repaid for the effort needed to digest this meaty volume.

We have recently noted the preoccupation of our chemical industry's research leaders with the problems of chemical uses. Such definite objectives—either to compound a new chemical to fill a known need or to uncover a new use for an old chemical—lend themselves admirably to Professor Fisher's methods which have found widespread and successful application to agricultural experiments and have been used in the study of ultra violet absorption spectra and the properties of cotton yarn. They would lend themselves rather easily to checking comparatively the properties of solvents, plasticizers, emulsifiers, wetting out agents, rubber accelerators, oxidizing and reducing agents. They ought to yield handsome returns in searching out the market for new materials. They would be extremely helpful in guiding development on new products.

Research in the chemical industry is a necessity, for no chemical maker dare rest upon his laurels. The rewards of a constant hunt for cheaper raw materials, for more efficient processes, for better by-product utilization, for improved chemical wares, have been a generous contributor to profitable operations during the lean years. Less waste motion, quicker returns, more accurate results in research are "a consummation devoutly to be wished".

Hydrogenation Pro and Con

An able study of coal as a source of liquid fuels is published in this issue which ought to be read in the bright light which has recently been thrown upon the dollars and cents aspects of the hydrogenation process in England. At the British Institute of Fuel recently, an informal discussion of the economic and nationalistic aspects of the Billingham plant brought forth a distinguished group of competent critics and discovered not a single defender of the operation or the Government subsidy that makes it possible.

These facts were developed: the I.C.I. is producing liquid fuel at a cost of 6 pence per gallon against an import price of gasoline of 3¾ pence thanks to a bonus in various forms of 4 pence per gallon at the expense of the British Government. The plant produces 4½ per cent. of the gasoline consumed. To construct plants to supply all needs would require 300,000 man-years and would require 75,000 men to operate it and supply it with coal and call for an investment of a billion pounds sterling.

The argument runs that interest on the capital investment would pay the dole for more men than the new industry would employ, and the idea of supplying all war needs for liquid fuel are simply too fantastic to contemplate. There were no pro arguments advanced; but, like our London contemporary, *The Chemical Age*, we should like to know how and why the I. C. I have invested (so it is reported) £6,000,000 in the hydrogenation process.

Natural Advantages

Chicago has protested violently the fact that the earth is a globe which revolves around the sun, giving New York the advantage of an hour earlier daylight. Thus, with dramatic emphasis, the Mid-west Metropolis points out a whole great sphere of activities which have been somewhat neglected by the advocates of planned economy.

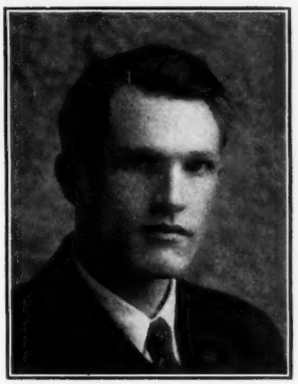
Nature is quite as unruly and menacing a performer upon the economic stage as is Man; and if Man must be regimented, can Nature escape control? Not likely; and indeed our benevolent Government has already done much to discount natural advantages not only of individuals and corporations, but also of beasts and crops. But all so far accomplished is admittedly only a puny beginning.

Like the unequal capabilities of Man, the spherical shape of our planet and the precession of the equinoxes cannot be abolished by law; but they can certainly be levelled off to a mean average. At this vernal season, for example, the female of *Gallus domesticus*, our humble hen, inspired by biological urges intractable to Dr. Tugwell's philosophy, lays more eggs than during the autumn and winter months. Hence eggs, like pie-plant and asparagus, are plentiful and cheap in the spring; and but a few years ago they sold—strictly fresh—at 20c a dozen at this season and at 60c at Christmas time. The cold storage industry has partly fixed this, and by taking surplus eggs of the spring market and storing them has raised the April price and lowered the December price, say roughly to 30c and 50c respectively. Instead of paying chiefly for corn as chicken feed, we must now pay also for ammonia which feeds the refrigerating plant. But this is plainly a very poor control, upset by foreigners who dump eggs here, and so we have of late been raising our tariff on poultry products. The idea is obviously eggs—never fresh—at 40c the year round with the corn, ammonia, and duties all tucked into the cardboard crate.

Admittedly this is an embarrassing example, for synthetic ammonia is one of the triumphs of modern chemistry and quite indispensable for national defense. But the principle is broad and affects many chemicals. Why shouldn't New England be paid a bonus on all caustic and chlorine consumed to equalize the unfair advantages of salt deposits in New York, West Virginia, Michigan, and Texas? Or why should not the Northwest be rebated by the Solid South for the anti-freeze alcohol they are forced to consume each winter?

Experiments in Bourbonism

As Talleyrand said of the Bourbon kings, our New Dealers "learn nothing and they forget nothing." Instead of the frankly experimental program designed to restore prosperity, which Franklin Roosevelt promised would be modified or dropped if proved impractical, business has been harassed by a pigheaded effort to perpetrate harmful mistakes. Even from the point of view of the New Dealers themselves, the N. R. A., the A. A. A., and the silver purchasers have failed dismally to accomplish what was hoped of them, while from the point of view of the nation as a whole, there has been proof positive that they have checked seriously the normal activities upon which the solution of our great and yet unsolved problem of re-employment depends. Yet the Administration is attempting to revive N. R. A.; modifying the A. A. A.; and persisting in the silver program.



Bituminous Coal

A source of gaseous and liquid fuels

By Gilbert Thiessen

Associate Chemist, Illinois State Geological Survey

MANUFACTURED gas was introduced first in London in 1800. The natural gas industry dates from about 1850. There are still many parts of this country, and the rest of the world, where gas is not available. There is, however, hardly a place on the globe that gasoline is not sold.

The reason for gasoline's importance is, of course, the internal combustion engine, which dates from 1877 and which assumed its present importance since 1900. Figure 1 charts the production of petroleum in the United States. The rapid rise in the production since 1900 is quite evident, as is also the great decrease in price. Competing with gasoline as engine fuel are diesel engine fuel oil and kerosene. The heavier oils are also widely used as fuels in boiler and industrial furnaces. The design of the modern ocean liner or battleship is built around oil as the fuel, and the dependence of the modern navy on oil fuel is largely responsible for "oil imperialism" and the frantic effort of those countries without petroleum resources to obtain liquid fuels somehow, and regardless of expense, from internal resources.

Our present sources of gas are from natural gas fields and from gas manufacturing plants. Natural gas is a wasting asset. Manufactured gas, on the other hand, will probably have increasing importance. No critical condition appears with respect to gas.

Unlike gas, at present we have for practical purposes only a natural source of liquid fuel, petroleum; and it, like natural gas, is also a wasting asset. Reserves of oil known to be in the ground are not any too plentiful. News from within the oil industry reveals a frantic

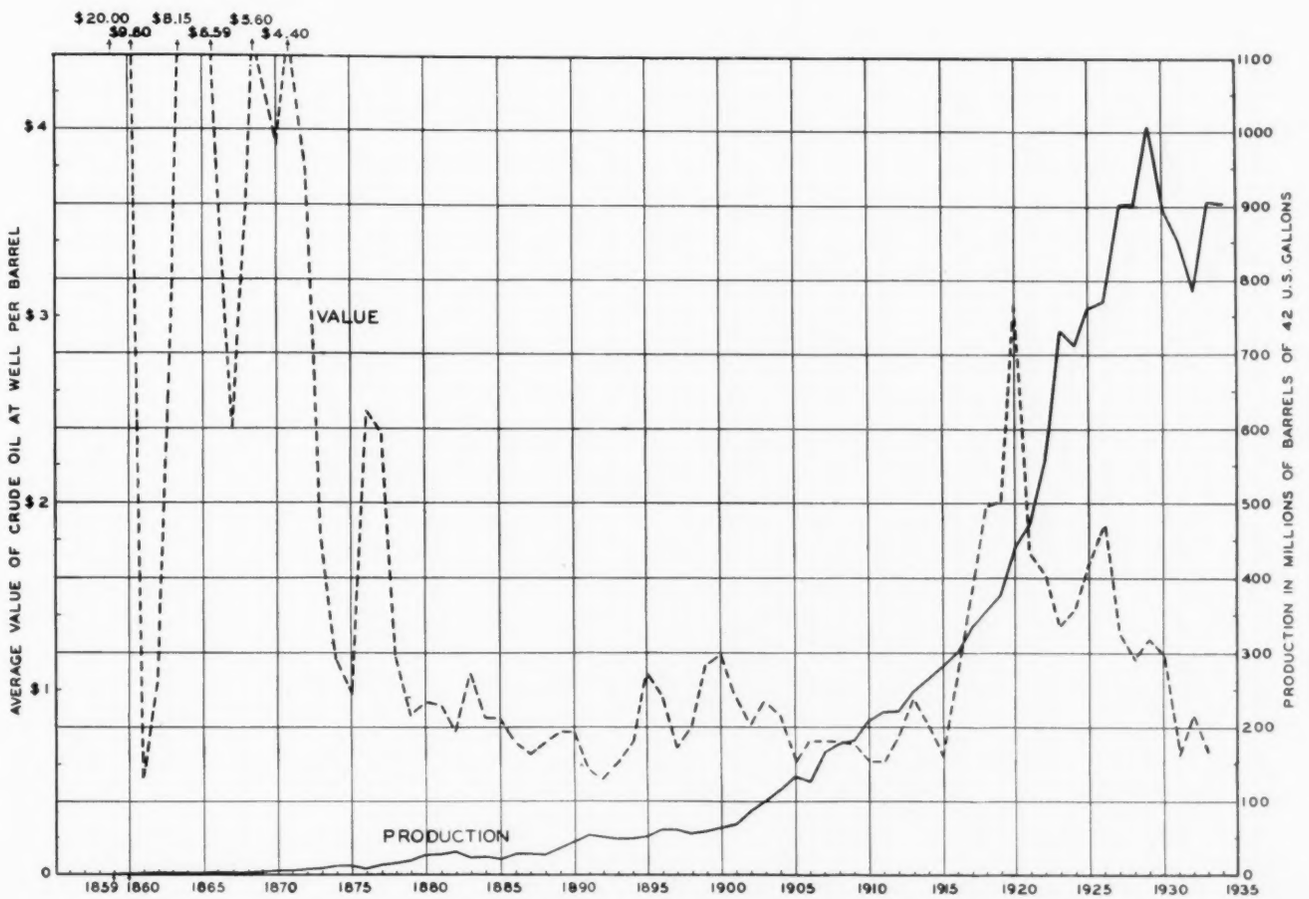


Figure 1. Production and value of crude oil, United States, 1859-1934.

Table I — Analyses of Production and Discovery Experience of the American Oil Producing Industry by Periods

PERIOD	Average annual production millions of bbls.	Average annual discoveries millions of bbls.	Ratio accumulated production to accum. discoveries	Ratio of av. annual prod. to av. annual discoveries	Ratio of average annual disc. to total discoveries
1859-1900	25	80	0.3	0.3	0.003
1901-1905	105	340	0.3	0.3	0.01
1906-1910	175	275	0.4	0.6	0.01
1911-1915	250	500	0.4	0.5	0.02
1916-1920	370	585	0.5	0.6	0.02
1921-1925	650	820	0.6	0.8	0.03
1926-1930	895	1990	0.5	0.4	0.07
1931-1934	870	580	0.6	1.5	0.02

search for oil by all of the major companies. The situation also is summed up in Table I, which was taken from the *Oil and Gas Journal* for May 2, 1935.[1]

Attention is called to the fact that in the four-year period, 1931-1934, there were produced and consumed approximately 35 times as much petroleum as during the forty-year period 1859-1900. Also, that while over four times as much petroleum was produced in the five-year period, 1901-1905, this was less than one-eighth of the amount produced in the four years, 1931-1934.

Oil is increasingly difficult to find and more expensive to produce, due to deeper wells and more troublesome strata. Production from existing pools also becomes more expensive because of increasing costs of pumping, as air drives, and water flooding. The ultimate effect will, of course, be a rise in the price of finished products in least competition, and a withdrawal of oil products from the more competitive markets. For example, growth of the cracking process for increasing the amount of gasoline obtainable from crude petroleum is shown graphically in Figure 2. It is conceivable that we will have either to look for new sources of liquid fuels or change the power units for our automotive vehicles.

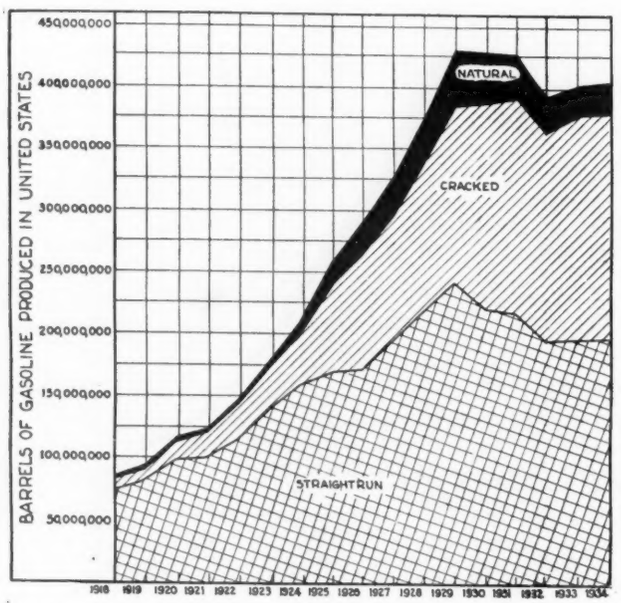


Figure 2. Survey of relative production of straightrun, cracked, and natural gasolines over the past seventeen years. (Oil & Gas Journal, Mar. 21, '35.)

Our other sources of liquid fuels can be the fossil solid fuels, *i.e.*, coals of any or all ranks and types, oil shales, or agricultural products. It has been shown many times that agriculture cannot begin to furnish sufficient liquid fuel to meet our present demands. The production of oil from shale involves a high handling charge which makes that source unattractive when compared to coal, which is our third alternative. Our reserves of coal are enormous when compared to our reserves of oil and gas.

Table II

Proven Reserves of Mineral Fuels in United States[2]

	Coal (Million net tons)	Natural Gas (Trillion cu. ft.)	Petroleum (Barrels)
1934 production	390	1,633 *a*	910,051,009
Total production to end of 1934	21,300 *d*	30,310 *b*	16,600,419,000
Proven reserves at end of 1934	3,414,550	40,000 *c*	13,000,000,000

a Does not include some one-half trillion feet blown into the air and wasted in 1934.

b Does not include some 8 trillion feet blown into the air and wasted from beginning.

c Includes some 10 trillion feet that will be wasted if production methods continue as at present and if the "law of capture" is not superseded or intelligently modified.

d Does not include some 9 billion tons left in the mines or otherwise wasted.

Technologically liquid fuels of suitable quality and in sufficient quantity can be made from coal. The question is, at present, one of economics to which, in many European countries, is added a desire for an autonomous economy. In the period 1830 to 1859, oil from coal and shale largely replaced sperm and whale oil as illuminating oil. These oils were, in turn, replaced by petroleum oils after 1859.

Liquid fuels may be made from coal by three basic processes: (1) recovery and refinement of the products of either the high or low temperature carbonization processes; (2) by destructive hydrogenation and refinement of the resulting products; and (3) by synthesis of hydrocarbon or alcohol mixtures from carbon monoxide and hydrogen obtained in the gasification of solid fuel. All three processes are now in commercial or semi-commercial use. Our abundant supplies of petroleum check the economic urge to develop these processes in this country, and that development has

been carried furthest in those countries without a national supply of petroleum, but with a highly developed industrialism and a highly nationalistic spirit, such as Germany, England, France, Japan, and Italy.

Oil from Coal Carbonization

Normally, one may expect to recover 9 gallons of tar and 3 gallons of light oils per ton of coal carbonized in a standard by-product coke oven (Fig. 3). By certain oven constructions, the yield of light oils can be increased at the expense of the gases and heavier tars. Lower temperature coal carbonization results in a much higher yield of light oils and tar, say 5 and 25 gallons respectively, but the economic and mechanical difficulties ordinarily make this operation unprofitable. In 1933, we produced approximately 360 million gallons of coke-oven tar and approximately 100 million gallons of light oil, in contrast to a motor fuel consumption of almost 16,000 million gallons. According to Dr. A. C. Fieldner, if all of the U. S. coal production were subjected to high temperature coking, the motor benzol

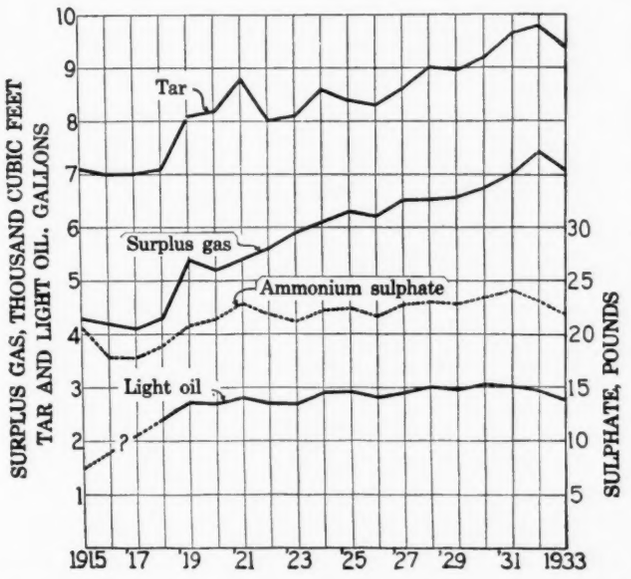


Figure 3. Average yield of principal by-products per net ton of coal carbonized in by-product coke ovens, 1915-1933. Figures for light oil represent average at plants recovering light oil. (U. S. Bureau of Mines.)

produced would amount to only 12 per cent. of the gasoline produced. Carbonization processes can supply but an insignificant part of our liquid fuel needs since liquid fuels from these processes are only by- or minor-products. The major problem of the coke oven operator is the disposal of his coke. Figure 4 shows certain trends in the coke market of which the steady growth of domestic coke should be of especial interest to operators producing coals unsuited for metallurgical coke.

Interesting experiments on coking tar coal and petroleum coal mixtures in Knowles type ovens have recently been reported from England.[3] These ovens are the same type as those operated by the Radiant Fuel Corporation to coke Illinois slack coal. The Knowles oven was designed to produce petroleum coke from petroleum refinery residues, for which purpose a number of installations here and abroad are in use. Experiments at Corby, England, show that mixtures of coal tar or coal tar pitch and either coking or non-coking coals yield excellent cokes when treated in these ovens. At the same time, large yields of light oils are obtained by cracking the heavy oils during the coking. Advantages claimed are an increased yield of light oils, decreased ash content in the coke due to the admixture of pitch coke, and the use of cheap non-coking slacks.

Destructive Hydrogenation of Coal

Coal is composed largely of unsaturated aromatic compounds of great molecular weight and complexity. Under proper conditions, unsaturated organic compounds take up hydrogen to form saturated compounds of similar molecular structure in which behavior coal is no exception. Hydrogenated coal is, however, not much more valuable than raw coal. A large proportion, half or more, is soluble in organic solvents and the material has great swelling and caking power. In hydrogenation, some liquid material is formed, the amount being insignificant up to 350° and increasing from there with increasing temperature. This procedure for producing coking coal from a non-coking coal is patented by the British Fuel Research Board (B. P. 301,720 (12/28). Using a temperature of hydrogenation about 450° C. and pressure of 200 atmospheres, bituminous coals may yield 30 to 40 per cent. of a tarry material as the result of treating coal alone with hydrogen. If, however, coal is dispersed in a liquid and then treated with hydrogen at 450° C. and 200 atmospheres pressure, in the presence of suitable catalysts, conversion to liquid products from 85 to 95 per

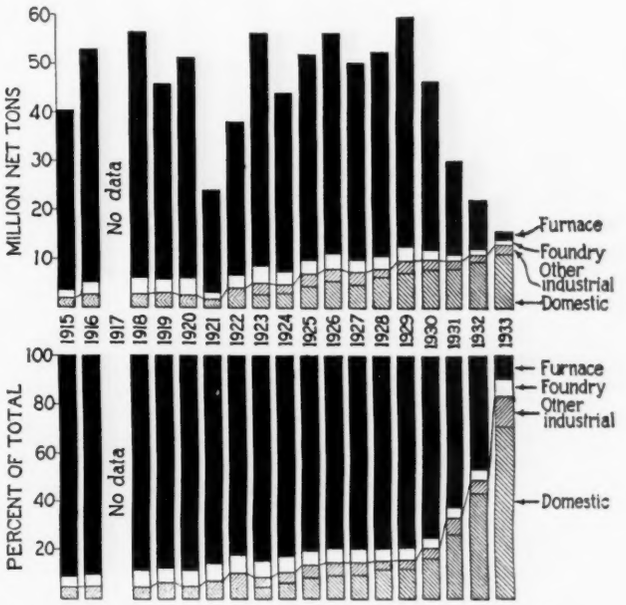


Figure 4. By-product and beehive coke sold for furnace, foundry, other industrial, and domestic use, 1915-1933. Figures for furnace coke include all coke used by the producer and not sold. The data represent the disposition made of the total production, including the exports, except that in 1915 and 1916 the exports are not included. (U. S. Bureau of Mines.)

cent. is obtained. This is the Bergius coal liquefaction process on which Germany and Great Britain today base their hopes for oil independence.

Heavy Oil is Recycled

The dispersing oil apparently dissolves the partially hydrogenated coal and permits further action of the hydrogen. The dispersing oil is itself acted upon during the process, furnishing an additional yield of light products. In commercial practice, therefore, heavy oil from the process is continuously recycled. The oil also serves the mechanical purpose of facilitation, the introduction of the coal into the converters in a paste. Figure 5 diagrammatically shows the complete, continuous process as commercially developed.

Some figures concerning the costs of the process may be gleaned from the new I.C.I plant at Billingham, England, estimated to cost $11,000,000 and designed to produce 37,000,000 gallons of gasoline annually from about 1100 tons of coal per day. About 440 tons of coal per day are hydrogenated, the remainder being used for power, steam, and hydrogen production. About 40-45 per cent. of the heat put into the plant in the form of coal is recovered as liquid motor fuel. The cost at the plant of a gallon of motor fuel, made from coal at $3.10 per ton, is estimated at from 11 to 12 cents. Thermal efficiency is about 45 per cent.; that, is 45 per cent. of the heat entering the plant in the form of coal is recovered as gasoline. The plant operates in competition to petroleum refineries only because of government guarantee of a preference tax which amounts to about 13 cents per gallon for the next 4½ years; or, if the company wishes, to one-half this amount for the next nine years.

The economic picture is not promising for the process in the United States at this time. If we have to turn to such a process, many American coals are suitable as a raw material. As mentioned above, the oil used to suspend the coal, and the heavy oils produced in the first stage, are hydrogenated by this process more easily than is the coal. As a result, the process actually finds wider use in the production of gasoline from petroleum and coal tars than from coal itself. As crude oil and gasoline prices rise, we may expect wider application of hydrogenation to petroleum before it is applied to coal.

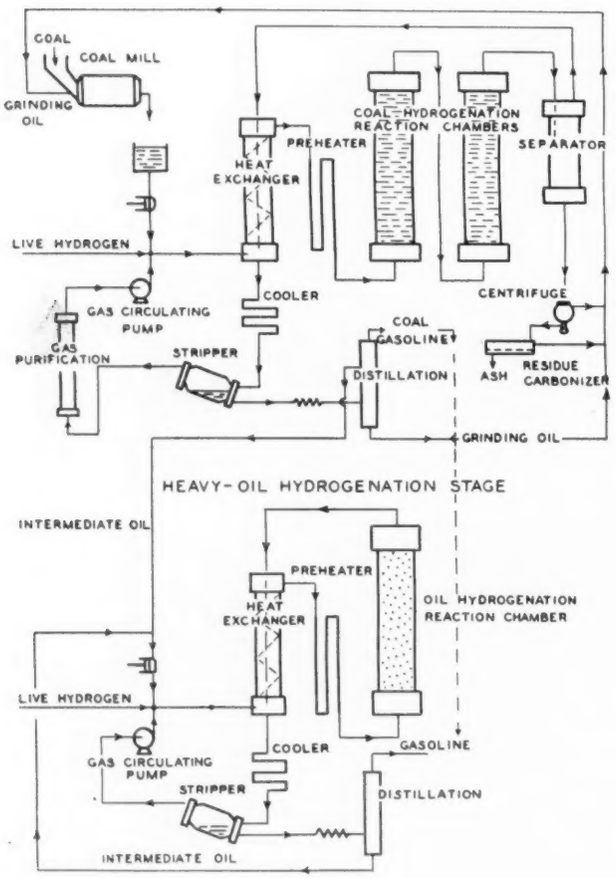


Figure 5. Gasoline from coal; the coal hydrogenation stage.

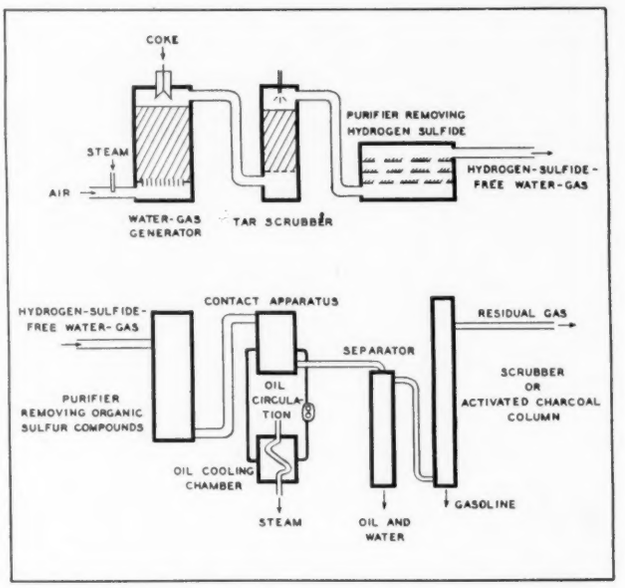


Figure 6. Flow sheet of Kogasin Synthesis, according to F. Fischer.

Synthesis from Carbon Monoxide and Hydrogen

Sabatier had shown as early as 1902 that methane could be formed by passing a mixture of carbon monoxide and three times as much hydrogen over a nickel catalyst at 300° C. Sabatier, it turns out, chose those conditions which favored the formation of methane. Fischer and Tropsch showed that, by varying the temperature, gas, composition, pressure, and catalyst, mixtures of alcohols, aldehydes, and acids could be obtained from carbon monoxide and hydrogen. The German I. G. in the meantime was working upon the synthesis of methanol from these gases. They found that, by using zinc oxide as the catalyst and working at pressures over 130 atmospheres and temperatures below 400° C., the reduction of carbon monoxide stops at the methyl alcohol stage. This process is now in large scale use all over the world. The mixture of oxygenated organic compounds was termed "Synthol" by its inventors. Synthol was not a very satisfactory

motor fuel, so researches were continued to attempt a complete reduction to the hydrocarbons. This was finally accomplished, the product being termed "Synthin," and later products "Kogasin." Figure 6 gives a diagrammatic scheme of a Kogasin synthesis unit. Water gas is produced, purified, and passed through the reaction chamber. The heat generated in the reaction chamber is removed by circulating oil passing through cooling coils embedded in the catalyst. The higher boiling products are condensed; the lower boiling ones removed by absorption. The process is remarkable for the variety of products which form and the dependence of the composition of the product upon catalyst and gas composition. Table III shows the composition of a typical product, and Table IV shows the variation in composition of the product upon catalyst and gas composition. This process is not yet in large scale commercial operation, but large scale experimental units have produced enough motor fuel for very extensive practical tests.

Table III[4 and 5]

Composition of Primary Product Kogasin

Product	Boiling range ° F.	Amt. Present Wgt. %	Olefine content Volume %
Spirit	Under 86°	4	50
Gasoline	86° - 390°	62	30
Oil	Over 390°	23	10
Solid paraffin:	Melting point:		
From oil	120°	7	
From catalyst	160° - 180° and over	4	

Table IV

Dependence of Olefine Content on Catalyst and Gas Composition

Catalyst base metal	Olefines in synthetic gasoline when using Water gas $1CO:1H_2$ vol. %	Mixed gas $1CO:2H_2$ vol. %	Cracked gas $1CO:3H_2$ vol. %
Cobalt	55	35	12
Nickel	35	16	5

Mention was made that Dr. Fischer prefers to work at low pressures. This entails the handling of large volumes of gas, but the equipment required is light and relatively inexpensive. The I. G., in attacking this problem, favors high pressures, under which conditions the volumes of gas handled in the system are small, but the equipment, while smaller, must be constructed to withstand the high pressures. In the absence of actual operating figures, no choice can be made as to which is the most economical method of working.

In countries desiring independence for essential materials, the question of lubricants is as important as a liquid fuel supply. It is technically possible to produce satisfactory lubricants from coal through hydrogenation of coal tar, or by synthesis from carbon monoxide and hydrogen. Probably there always will be sufficient petroleum to meet this country's needs for lubricating oil. Even so, the importance of the type of petroleum from which lubricating oil is made is becoming less, as more highly developed methods of producing the lubricants are used. In modern oil refining processes using hydrogenation, aluminum chloride treatment, or differential solvent extraction, the character of the oil produced bears little resemblance to the raw stock.

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[4] Koch, H., Die Benzinsynthese aus Kohlen oxyd und Wasserstaft bei gewohnlichem Druck nach dem Verfahren von F. Fischer und Tropsch, Gluckauf, *71*: 85-90 (1-26-'35).

[5] Fischer, Franz, Die Synthese der Treibstoffe (Kogasin) und Schmierole aus Kohlenoxyd und Wasserstoff bei gewohnlichem Druck, Brennstoff Chemie, *16*: 1-11 (1-1-'35).

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World Mercury Markets

Fluctuations in mercury prices during the past few months have been of relatively minor proportions, and while the market as a whole is still decidedly strong, there seem few reasons for anticipating any pronounced upward movement in the metal in the near future. The restrictions in Italy's exports of mercury to the sanctionist countries have been more than outweighed by the much higher exports from Spain and while recent production figures for Mexico and the United States are still lacking, the diminished purchasing of imported material by the latter country argues a higher output of the domestic metal in 1935. For many years past the mercury production capacity of Italy and Spain has been far more than sufficient to cover world demand, this state of affairs being the factor primarily responsible for the formation of the Italo-Spanish cartel in the liquid metal. To Spain the present situation has brought advantages, in that the mercury industry in that country has been able to make considerable inroads into its accumulated stocks and also to intensify its mining activities. The possibility of difficulties being experienced in the purchase of Italian mercury was realized by the market over the greater part of last year, and led to an increasing volume of international trade in the metal, an increase that cannot be explained wholly by a rise in the industrial consumption of mercury. British imports last year, for instance, were 1,861,284 pounds, after the 1,598,924 pounds of 1934; while re-exports of mercury from the U. K. increased between the two years by less than 100,000 pounds.

Some months ago, we made the suggestion that the embarking by Italy upon its East African venture was more likely to be accompanied by an increased exportation of mercury in the efforts of Italy to secure much needed foreign credits. At that time no definite measures of economic sanctions had been adopted by the League of Nations; and while in practice the effect of these sanctions has been to limit the importance of a number of markets for Italian mercury, the foreign outlets have been far from entirely closed. It is reported that the Monte Amiata company has been able so to develop its total exports that its stocks of metal have been virtually liquidated, while a dividend distribution by the company on its ordinary capital is foreshadowed. Altogether, even if the last year's output by Mexico and the U. S. is found to have shown no very great increase over 1934, the purely statistical position in other directions reveals no international shortage in mercury. *Chemical Trade Journal*, Feb. 14, '36, p. 123.

Chemical Holdings of the Investment Trusts

By F. A. and M. S. Hessel

THIS, our fourth annual appraisal of the chemical holdings of the leading investment trusts, finds that "chemicals" still represent but a small part of the total investment of the trusts and the number of chemical companies stocks held was smaller last year than a few years ago.

It does appear, however, that the managers of the trusts appreciate the remarkable stability of the chemical industry. For, in recent years, during which their holdings in other industries show wide variations, their interest in chemicals has remained almost constant. The percentage of trust holdings invested in chemicals, while not following the steady upward trend of the chemical industry, has, at least, reflected that industry's strong position in the years of economic unrest.

These facts are specifically illustrated in Table I which shows the approximate percentage, in relation to the total common stock investments, of various classes of stocks held by Lehman Corporation, as of December 31, 1930 and December 31, 1935. It is at once evident from this table that the percentage invested in chemicals is below the average for both years. Of the thirteen industries listed in 1930, and the fifteen in 1935, eight are represented by larger percentages than that assigned to chemicals. On the other hand, it appears that the managers of this trust held substantially the same opinion of chemicals in 1935 that they had five years ago, while their confidence in several of the industries most highly regarded in 1930 had been considerably shaken.

For instance, instead of the 15 per cent. public utilities in 1930 we find only 8 per cent. of Lehman Corporation funds invested in utilities in 1935, and the percentages invested in most of the other seven leaders have suffered declines. Manufacturing alone was found more interesting in 1935 than in 1930. Great changes have occurred with regard to some industries formerly represented by low percentages. Oils, particularly, a fraction lower than chemicals in 1930, have risen 12.1 per cent., or one of the leaders, in 1935; and

Table I

Approximate percentage in relation to total common stock investments of various classes of stocks held by the Lehman Corporation as of December 31, 1930, and December 31, 1935.

	1930	1935
Railroads	6.9	4.3
Public Utilities	15.0	8
Automotive	1.3	7.7
Banking Insurance	13.5	9.5
Finance	...	..
Chemical	5.7	5.4
Electrical Equipment	1.4	2.6
Food & Beverages	12.2	8.1
Manufacturing, etc.	12.0	16.4
Merchandising	13.6	6.8
Metals & Mining	10.2	8.4
Oils	5.	12.1
Tobacco	2.8	2.9
Building, Construction	...	5.1
Steels	...	2.
Investment Trust	.7	.9

Table II: Number of Shares of Stock held at end of 1934 and 1935

Chemical Companies	*Adams Exp.*		*General Am.*		*Incorp. Inv.*		*Lehman*		*Cap. Adm.*		*Tri Cont.*		*Vick*	
	1934	1935	1934	1935	1934	1935	1934	1935	1934	1935	1934	1935	1934	1935
Union Carbide	12,200	20,000	....	....	15,000	15,000	9,000	8,000	....	1,600	....	4,500	....	....
Allied Chemical	3,000	6,000	4,500	4,000	....	6,000	....	....	....	600	....	3,800	2,000	1,500
Du Pont	....	....	2,000	....	15,000	15,000	8,000	7,500	....	....	....	....	500	500
Air Reduction	....	....	....	....	10,000	10,000	1,800	900	....	500	....	500	2,200	2,200
Eastman Kodak	4,500	5,000	....	2,500	....	....	500	2,300	800	500	3,500	1,000	1,700	1,000
U. S. Industrial Alcohol	....	....	....	....	15,000	19,400	....	....	....	....	....	....	....	....
Commercial Solvents	5,000	....	....	....	....	....	....	....	....	....	....	....	....	....
Texas Gulf Sulphur	....	....	....	....	....	....	1,000	....	....	....	....	....	....	....
Mathieson Alkali	21,400	20,000	....	....	....	....	....	....	....	....	....	....	....	....
American Cyanamid	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Monsanto	....	....	....	....	....	....	8,100	10,000	....	....	....	....	....	....
Freeport	....	....	....	....	....	....	10,700	10,700	....	....	....	....	....	....
Dow	....	....	....	....	7,500	7,500	5,500	6,000	....	....	....	....	....	....
Hercules	....	....	....	....	8,600	10,000	....	....	50	500	....	2,000	....	....
United Carbon	....	....	....	....	....	....	11,600	5,000	....	....	....	....	....	....
Sherwin Williams	....	....	....	....	....	....	5,600	5,300	1,400	1,400	2,000	2,000	....	500
Columbian Carbon	....	....	....	....	....	....	....	....	....	....	....	....	1,500	1,000
Atlas	....	....	....	....	....	....	5,300	....	400	700	....	2,500	....	....
American Commercial Alcohol	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Devoe	....	....	....	....	....	....	....	....	1,100	....	1,500	....	....	....
Glidden	....	....	....	....	....	....	....	....	2,000	....	2,000	....	....	....
American Agricultural Chemical	....	....	....	....	....	....	....	....	....	....	900	....	....	....

the automobile industry, represented by only 1.3 in 1932 has risen to 7.7 per cent. in 1935, while building and construction, unlisted in 1930 is represented by 5.1 per cent. five years later.

The amount invested in chemicals is not only small, but less in 1935 than in 1930, nevertheless that decrease, only .3 of a per cent., is very slight. Several trusts not only increased their total holdings of chemicals in 1935 but enlarged the scope of their interest in this industry. Of the seven trusts reviewed, only Lehman Corporation and Adams Express invested in fewer chemical companies in 1935 than in 1934. All the others diversified their interest in the industry, as may be seen in Table II. Lehman Corporation, we notice, while interested in fewer chemical companies last year than in 1934, nine instead of eleven, still had the longest list of chemical companies, General American still the shortest—Tricontinental was the most active in chemical stocks, selling out their interest in three companies and acquiring stock in five others with a total addition of two to their list of chemicals.

Fewer chemical companies are represented in the portfolios than in 1934. The 1935 list includes 15 chemical companies whereas in 1934 the seven trusts among them owned 20 different chemical stocks. There is evident a tendency to drop the smaller companies and increase commitments in the leaders, making the trust portfolios, insofar as chemicals are concerned, much what they were in 1929 when only eleven different chemical companies appeared among their holdings.

Union Carbide, Allied, Air Reduction, and Eastman Kodak are all held by more trusts in 1935 than in 1934 with but two smaller companies enjoying a comparable popularity—namely, Hercules and Sherwin Williams. Among the leaders only du Pont was less popular than the year before, and, even so, it was held by more than the average.

In Table III, showing the total amounts invested in chemicals by the seven trusts, for the years 1929, 1934 and 1935 and the approximate percentage of that total represented by each of the chemical companies, we find that same picture. Du Pont alone of the leaders represents a smaller percentage in 1935 than in 1934.

On the other hand, it is the only one to have a higher percentage in 1935 than in 1929. Indeed, du Pont is one of only four of the eleven companies listed in 1929 to be represented by a large percentage of the total invested in chemicals in 1935.

Comparing 1929 and 1934 in Table III, only three of the ten stocks listed both years were held in greater amounts in the latter year. The holdings in all the others, including all the leaders, had been decreased. Monsanto, Mathieson and U. S. Industrial Alcohol alone were held in greater amounts with Monsanto far in the lead, showing an increase of close to 400 per cent. over 1929, while the amounts invested in Mathieson and U. S. Industrial Alcohol had also been increased substantially.

Comparing 1934 and 1935, we find a very different picture. As in 1929, the largest percentage of the total investment in chemicals is in Union Carbide. The percentage invested in Allied shows the largest increase over 1934 with Union Carbide a close second. Moreover, all the leaders, with the exception of du Pont show an increase in percentage while the majority of the other stocks show a decided decrease.

As for the amounts invested in these various stocks in 1934, and 1935, most of them were considerably increased in the latter year; that is, eleven of the fifteen listed both years were increased. The greatest difference was in the amount invested in Allied Chemical which was increased by 155 per cent.; the next

Table III

Chemical Companies	*Amounts invested in Chemical Stocks by 7 Investment Trusts*		
	1929	1934	1935
Union Carbide	$5,076,540	$1,705,900	$3,499,000
Allied Chemical	5,023,650	1,306,100	3,449,000
Du Pont	2,925,000	2,428,300	3,208,000
Air Reduction	2,375,000	1,575,000	2,493,000
Eastman Kodak	2,318,000	1,232,000	1,920,000
U. S. Industrial Alcohol	411,000	667,500	834,000
Commercial Solvents	381,300	108,100	.....
Texas Gulf Sulphur	357,500	34,000	.....
Mathieson Alkali	284,700	712,400	605,000
American Cyanamid	224,000	.....	.....
Monsanto	99,470	478,000	890,000
Freeport	.....	275,500	324,000
Dow Chemical	.....	1,176,500	1,310,000
Hercules Powder	.....	644,400	1,087,000
United Carbon	.....	553,300	348,000
Sherwin Williams	.....	778,500	1,134,000
Columbian Carbon	.....	112,125	96,000
Atlas Powder	.....	228,000	155,000
Devoe & Raynolds	.....	131,300	.....
Glidden	.....	109,500	.....
American Agricultural Chemical	.....	42,300	.....
	$19,476,160	$14,298,725	$21,352,000

Chemical Companies	*Approximate Per Cent. of Total Invested in Chemical Stocks*		
	1929	1934	1935
Union Carbide	26.1	11.9	16.4
Allied Chemical	25.8	9.2	16.2
Du Pont	15.0	17.0	15.2
Air Reduction	12.	11.0	11.6
Eastman Kodak	11.9	8.6	9.
U. S. Industrial Alcohol	2.1	4.7	3.9
Commercial Solvents	2.0	.8	..
Texas Gulf Sulphur	2.0	.2	..
Mathieson Alkali	1.5	5.0	2.8
American Cyanamid	1.1	..	..
Monsanto	.5	3.3	4.2
Freeport	..	1.9	1.5
Dow Chemical	..	8.2	6.1
Hercules Powder	..	4.5	5.1
United Carbon	..	3.9	1.6
Sherwin Williams	..	5.4	5.3
Columbian Carbon	..	.8	.4
Atlas Powder	..	1.6	.7
Devoe & Raynolds	..	.9	..
Glidden	..	.8	..
American Agricultural Chemical	..	.3	..
	100%	100%	100%

largest was the increase of 105 per cent. invested in Union Carbide, followed by Monsanto with 84 per cent. The largest decreases were Glidden, Commercial Solvents, American Agricultural Chemical, Texas Gulf Sulphur and Devoe and Raynolds in which $109,500; $108,100; $42,300; $34,000 and $131,300 respectively were invested in 1934, nothing in 1935.

Total investments in chemicals for 1929, '34 and '35 were larger in '35 than in either of the other two years. In 1934, the amount $14,298,925 invested in chemicals by the seven trusts was 26 per cent. less than that of 1929. But in 1935, $21,352,000 was invested in chemicals—an increase of 49 per cent. over 1934, 9 per cent. over 1929.

Industry's Bookshelf

Probability and Random Errors by W. N. Bond, 141 pp., Longmans, Green, $3.75.

Evaluation of scientific results by consideration of probable degree of accuracy prevents unnecessary repetition of experiments and fictitious accuracy. This text explains methods of evaluation with direct applications for research in physics and chemistry.

Insect Enemies of Shade Trees by Glenn W. Herrick, 417 pp., Comstock Pub. Co., Ithaca, N. Y. $5.

Complete, handy, accurate—an invaluable handbook covering both the insects and their identification and accepted insecticides for specific uses.

Chemical Engineering Plant Design by Frank C. Vilbrandt, 341 pp., McGraw-Hill, $4.

A needed book, for both text and reference, which has been executed with admirable clarity and completeness. While written primarily for school use, Professor Vilbrandt has given his work a permanent value by the inclusion of valuable tables and other reference material the plant executive needs frequently.

Problems of Soil Microbiology by D. Ward Cutler & Lettice M. Crump, 104 pp., Longmans, Green, $3.20.

An up-to-date review of the fast-growing branch of agronomy that yearly becomes more and more important in the practical application of fertilizer formulation and application. A brief, business-like treatment, supplemented with a good bibliography.

Metallurgy by E. I. Rhead, 382 pp., Longmans, Green, $4.

A new edition of a book that has been standard for forty years, and been already through three previous revisions and many printings brings up-to-date a thoroughly useful reference work. Rhead has always been famous for his keen appreciation of the chemistry involved in metal working, and for this reason his book is of extra value in our field.

Ideas of Physical Chemistry by H. and H. A. C. McKay, 301 pp., Heineman (London) 7/6.

The difficult task of explaining accurately the recent theories, interpreting the new facts, and correlating both to everyday life, is very brilliantly executed in this sound and readable book. A first class introduction to this little-understood subject.

The Principles of Experimental and Theoretical Electrochemistry by Malcolm Dole, 549pp., McGraw-Hill, $5.00.

Modern mathematical-electrical viewpoint is maintained throughout this experimental discussion, and tends toward a wide scope of the subject, turning away from "classic" definition, and teaching this very definite science as "chemical" as well as "physical" energy.

Labor, Industry and Government by Matthew Woll, 341 pp., Appleton-Century, $2.

The best trained and most efficient brain in labor circles sets forth the labor gospel according to Gompers and raises some timely questions that industrialists must answer soon and correctly. A really important and valuable contribution to the current labor debates.

An Introduction to Scientific German by Otto Koischwitz, 155 pp., F. S. Crofts & Co., $1.40.

Anyone who has acquired a working knowledge of scientific German will remember with pain the transition from Folk Tale to Gesellschaft. Koischwitz offers a gradual preparation for the typical difficulties of scientific texts.

A Text-Book of Organic Chemistry by John Read (2nd Ed.), 703 pp., G. Bell & Sons, London, 12/6 net.

The historical preface to this revised edition is an excellent introduction to the subject matter itself. Read is to be congratulated, too, for not overlooking the economic importance of his subject. A fine text, worthy of careful use.

Men, Money and Molecules, by Williams Haynes, 186 pages, Doubleday, Doran, N. Y. City, $1.50.

For the first time "John Doe" has a concise authoritative, understandable story of the chemical industry, written in readable style by one who has spent twenty years in daily contact with our business and technical leaders, who has won their confidence, who has travelled thousands of miles viewing chemical manufacturing operations. The book contains vital economic interpretations; portrays the triumphs of chemical synthesis over the vagaries of natural raw materials; sanely indicates the future of chemistry's contribution to "the more abundant life," and explains in understandable language the part chemicals play in our daily lives.

Practical Biochemistry by A. T. Cameron and Frank D. White (3rd Ed.), 241 pp., Macmillan, $2.75.

Originally designed for the needs of pre-medical students, the revised edition may now be used by the chemist as well.

Statistical Methods by Herbert Arkin and Raymond R. Colton (2nd Ed.), 228 pp., Barnes & Noble, $1.50.

Really a handbook, this highly concentrated text is useful for those actually engaged in statistical work in economics, business, science, or education.

The Ideas of Physical Chemistry by H. & H. A. C. McKay, 301 pp., Heinemann, $4.

This book will help the layman understand popular discussions on modern theories of matter. The style is essentially simple and does not assume much knowledge on the reader's part. Wisely, the authors have included a vocabulary of chemical terms which immensely simplifies the text.

Alcohol Under the State Liquor Laws—Summary and Analysis by James P. McGovern (2nd Ed.), 346 pp., The Industrial Alcohol Institute, Inc., $2.50.

A grand summary of alcohol control in the several states. The methods of control by states vary so widely that a yearly analysis of this type becomes indispensable to all engaged in interstate alcohol trade.

Hasslacher of R & H

THE morning's mail, a great stack of letters and orders nearly two feet high, had been read, every piece of it, by five men seated around an oval oak table and shuffled by departments into half a dozen neat piles. With a quick, characteristic gesture, Jacob Hasslacher slipped his gold-rimmed pince-nez from his nose to the thumb of his left hand, abruptly shoved back his chair, and glanced at the big wall clock. It was twelve minutes before nine.

"Is there anything else—special?" he asked.

This was the regular morning ritual at the headquarters of The Roessler & Hasslacher Chemical Company. The officers and their chief read all orders and all the correspondence so that each might be fully informed on all details of the business, a task that also included a visé of the replies to important letters. Afterwards there was a few moments' terse discussion of any important, immediate development. By nine o'clock, each one was back at his own desk and ready for the day's work.

On this particular morning—it was a snowy day between Christmas and New Year's in December, 1916—the sales manager said, "They have advanced the price of sodium cyanide to two dollars."

"They?" Mr. Hasslacher shot back. "What 'they' do you mean?" and when the sales head did not answer, he added, "You mean the same old speculators and second hands?"

"Yes," Philip Schleussner assented, "the same second hands."

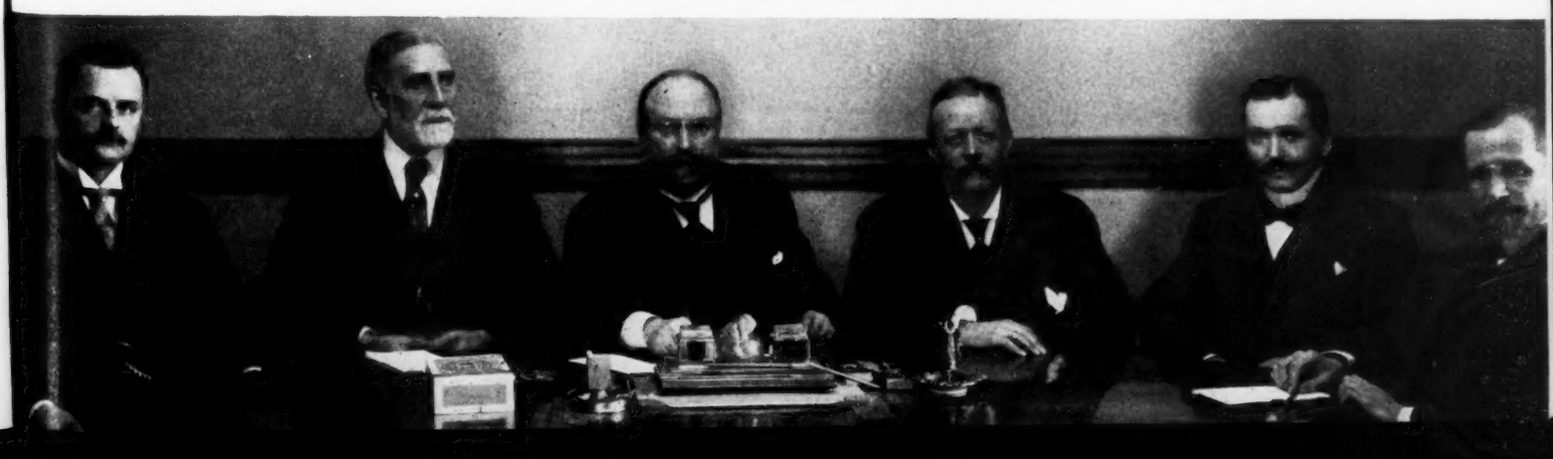
"And 'advanced'?" continued Mr. Hasslacher, "what is the meaning of 'they advanced'?"

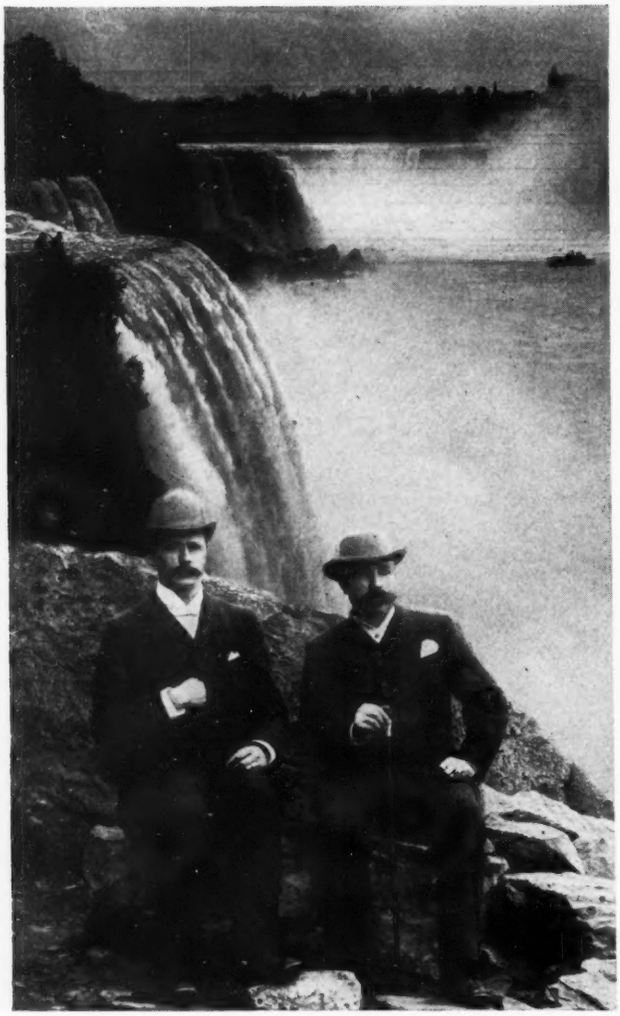
Scorn rang in his voice. He was a manufacturer and merchant, and he had no patience with speculation in chemicals, but Mr. Schleussner continued, "I mean, Mr. Hasslacher, that second hands are now asking two dollars a pound for sodium cyanide, and" he added, "getting it."

Roessler & Hasslacher, real producers, were still selling at 25¢, and more than that, they had signed up contracts with regular customers for the coming year at that modest price. Throughout the year 1916, the open market price had advanced steadily from 28¢ in January to 40¢ in March, to 50¢ in September, to 68¢ in October, to 87¢ in November, and during the closing month it had sky-rocketed to an end-of-the-year figure of $2. During this same time, the R & H price had been advanced from 22¢ to 25¢.

This happened in the thick of the wild war scramble for chemical supplies. The European conflict had not only blocked the usual channels of chemical trade; but it had also created an enormous, insatiable demand. Importers and dealers scoured the world for chemicals. Manufacturers labored twenty-four hours a day with makeshift apparatus and impromptu processes to increase their output and to produce new materials.

Executive staff of Roessler & Hasslacher photographed before the World War. Left to right, William A. Hamann, John K. Creevey, Jacob Hasslacher, Franz Roessler, Hans Foersterling, Hugo Du Bois.





Left, Director Alexander Schneider of Scheideanstalt, and right, Mr. Hasslacher, from a photograph taken in the 'Gay Nineties.'

And day after day, warring nations and great industries bid and bid and bid against each other for sorely needed chemical supplies. Overnight prices jumped upwards and up again the next day. Fortunes were made by second-hand dealers who speculated in chemicals they had never seen and whose names they hardly knew.

Throughout this chemical orgy, Roessler & Hasslacher had maintained the policy of supplying the chemicals they made to their regular customers at fair prices. This was true not only of cyanides but of formaldehyde, chloroform, hydrogen peroxide, and the whole list of their own manufactured products. More than this, they were still willing to write firm contracts with consumers who were old customers for the coming year at prices far below the mounting market.

Such discrepancies between their prices and the open market quotations were costing the firm what appeared particularly to the sales forces to be perfectly legitimate profits. They subscribed to Mr. Hasslacher's principle of "taking good care of their regular customers"; but, as Mr. Schleussner was at pains to point out, it was one thing to protect their friends and quite a different thing when the friends took advantage of them.

"The spread has become so big," he said, "that some of our contract customers are re-selling our materials at the market price. We have proof positive of this, Mr. Hasslacher, and you cannot blame them. The temptation is simply too great."

"If you are positive that they are re-selling, we shall sell them no longer. We are selling them 'for their own requirements.' That is a part of the contract, and they have broken that contract."

"If we do that," put in William Hamann, "we shall win more ill-will than all the good-will we have earned by holding prices down."

"I understand that perfectly," said Jacob Hasslacher. "That is why we must be absolutely certain that they are re-selling, and in no case should we sell more than the maximum set forth in our contracts. Let us all understand each other clearly. I have been in this business a long time, and I have learned two things well. Easy profits are hard profits. If you take care of the customer, he will take care of you. We are not losing money: we are doing the biggest business we have ever done in our history. But this war is not going to last forever; and when all these fly-by-nights are forgotten, we shall be making money still selling those same customers. So let's talk about this no more."

That was Mr. Hasslacher's way of doing business. No expediency could swerve him from an obligation. He recognized no excuse in fulfilling the exact terms of an agreement.

One year, he contracted with an American producer for his supplies of a certain chemical, the foreign price of which broke so sharply that his supplier shut down his own plant, bought abroad, and sold to R & H at a handsome profit. When he learned of this, Mr. Hasslacher laughed and congratulated the seller upon his good sense. But he continued to take in every pound for which he had contracted at the price he had agreed to pay. Several years later, the circumstances were reversed; and when his fellow manufacturer came and asked him for some price concession on his contract, Mr. Hasslacher refreshed his memory, and that contract, too, was carried through to the last pound and penny.

The very essence of a chemical sales contract was to Jacob Hasslacher the certainty of supply at a known cost which it gave the buyer, and the assurance of sale at a known profit which it gave the seller. To temper with its terms was simply to defeat its purpose, and he believed sincerely that many of our economic maladjustments arose from the insecurity injected into business life by careless purchasing promoted by lax contracts.

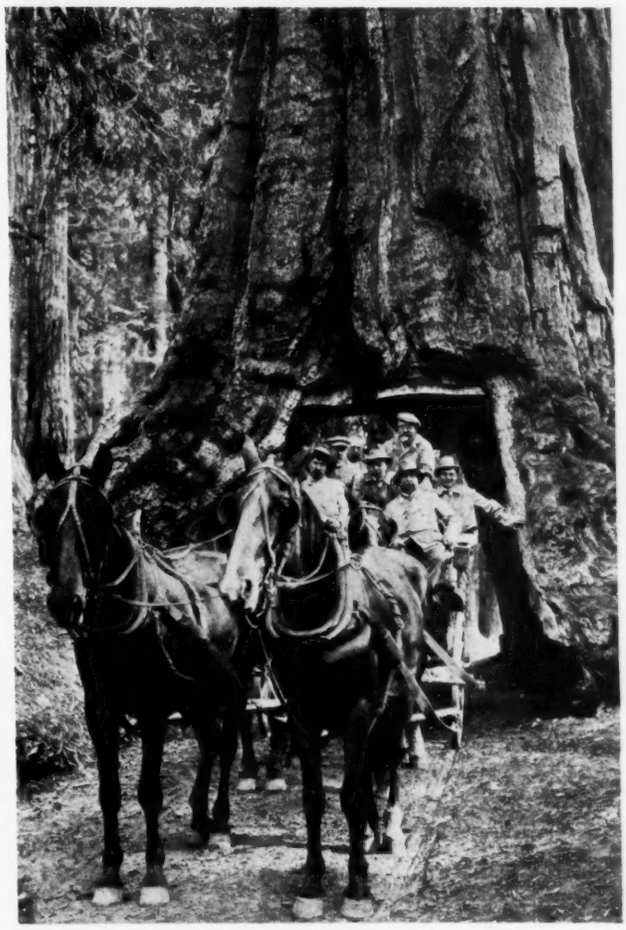
His convictions were not less strong on the subject of business sincerity. The sales agent for one of the big alkali companies, at a time before these producers sold direct to contract buyers, once secured from him a year's contract upon the direct representation that the price for the quantity bought was the lowest offered.

Mr. Hasslacher subsequently learned that another buyer was paying less for the same tonnage of caustic soda. He summoned the salesman to his office; demanded an immediate refund on all deliveries made; cancelled the contract forthwith; and issued instructions that in the future R & H bought nothing from that distributor.

Although in such incidents Jacob Hasslacher appears stiff-backed in comparison with the give-and-take policies of the chemical trade since the World War, nevertheless he was never arbitrary in his position because he always stood firmly upon principles that all who did business with him soon learned and could clearly understand. In fact, he abhorred misunderstandings and insisted that all matters of importance be set forth in black and white. Once that was done, he refused to recognize any blends of grey. He believed thoroughly in taking the best possible care of customers. As an example, the price of cyanide rose to $3 during the war; but no old R & H customer ever paid more than 35¢ for his legitimate supplies. He did not, however, subscribe to the facile doctrine that the customer is always right.

Yet above all else, Jacob Hasslacher was a quick thinking merchant. It is in those words that he is characterized by a man who, under his tutelage, grew from office boy to director in the R & H company; and all who associated with him agree that his most notable talent was his accurate commercial insight into all chemical affairs.

He backed this talent with exceptional concentration of purpose; business courage of a high order; and boundless physical energy. Throughout his active career, he repeatedly declined flattering invitations to serve as a director of banks, insurance companies, and outside industrial enterprises, saying always that his own business demanded his full time and his undivided attention. He was invariably receptive to all suggestions from his research staff, and he was always ready to risk money on either a new product or a new process. It is significant that when he died his safe deposit box contained besides R & H stock, little beside gilt-edge bonds. Until he retired, he was at his desk every morning at eight o'clock, and it is still remembered that long before subways and motors, he once went back and forth between the New York office and the plant at Perth Amboy, N. J., three times in one day, carrying a stenographer with him and dictating a great sheaf of correspondence and composing two important reports. Finally, he combined business thrift with personal liberality. Charcoal bags were in his day a "returnable container" for which there was a credit of $5 a hundred. Unfortunately, they were worth so little, so hard to keep track of, and above all so useful as work-aprons in the plant, that small wonder they were not as scrupulously inventoried as carboys and steel drums. A telegram from the charcoal supplier, begging for the prompt return of any and all bags on hand brought to Mr. Hasslacher's personal attention the fact that they were short about three hundred of these returnable bags. For that $15 he turned the office, the shipping room, the warehouse, and the Perth Amboy plant all upside down, yet that selfsame year, because the cost of living was rising fast, he took half of his personal share of the profits and gave it as a bonus to all the salaried employees.



Mr. Hasslacher and a party of friends from abroad, driving through one of the giant redwood trees in California. Front row, driver; in back, Messrs. Kroeger, Kuhnheim (Kuhnheim & Company), Jacob Hasslacher, Dr. Bueb, Director Schneider (Deutsche Gold und Silber Scheideanstalt) and Dr. Bantlin (Hiag firm of Konstanz).

Such a man was Hasslacher of R & H—a keen merchandiser of chemicals, scrupulously honest, dominating rather than domineering; a jolly, genial Epicurean who relished a good joke, a fine dinner, a vintage wine. He came to the United States in 1884 and the following year went into business with Franz Roessler. He died in 1921, and in 1930 the company they founded was bought, two shares for one, by the du Ponts.

His father, Georg Hasslacher, was a public official in charge of the spa at Bad Ems in Germany representing the Duke of Nassau. There Jacob Hasslacher was born in 1852. He went at first to the public schools in Ems and later to the Hadamar Gymnasium from which he was graduated in 1872. With some training in the sciences, he became a salesman, entering the employ of the Deutsche Gold-und-Silber Scheideanstalt vormals Roessler of Frankfurt-am-Main. Here the young

salesman was given a thorough-going course of training in all branches of the business.

A few years before Jacob Hasslacher joined the forces of the Scheideanstalt—in 1871 to be exact—that company had been founded upon the interests and the staff of the important Roessler family which for generations had served the old German Free Cities as Masters of the Mint. Among the products manufactured was a fine liquid gold largely used by the ceramics industry in decorating chinaware. This item began to develop a promising volume of export to the United States, and in 1882 young Franz Roessler was sent to America to start a factory and cultivate the American trade. The factory was started in Brooklyn; but the business did not come up to expectations. Recognizing that Roessler, an extremely capable technician, needed an able assistant in the sales work, the company selected Hasslacher to strengthen their American venture. In 1885, a year after he came to this country, Hasslacher with Roessler organized the company which bore their names. The Anstalt was a third and controlling partner, and when the partnership became a corporation in 1889, the German company retained a majority of the voting stock. The active management, however, rested entirely with young Roessler for the plant and young Hasslacher for the business offices.

A new factory was built over at Perth Amboy to produce acetone from acetate of lime and chloroform from the acetone, also potassium cyanide from the prussiate, and quite an extensive line of pottery and ceramic colors. This operation began in October, 1885, and later there were added tin oxide, the metallic cyanides, and peroxide of hydrogen.

It became the established policy of the young firm to import chemicals from Germany until such time as a sufficient demand had been built up to justify a manufacturing operation in this country. Thus, in the late nineties, they organized the Perth Amboy Chemical Company to manufacture formaldehyde, in which enterprise R & H and the Hiag firm of Konstanz were partners. In the meantime, they had perfected a process for the production of the double cyanides by fusing sodium with the prussiate of potash. About this same time, Hamilton Young Castner had developed a practical electrolytic process for the manufacture of metallic sodium. Rights to this process were acquired to operate and the Niagara Electrochemical Co. was formed with the English Castner-Kellner Alkali Company, the German Anstalt, and the American R & H equal partners. Roessler remained responsible for the plant operations and Hasslacher for the sales and business administration. Sodium also became the starting point in the manufacture of sodium peroxide, the base from which the hydrogen peroxide and the perborates were made. In 1925, the Niagara Electrochemical enterprise was consolidated within The Roessler and Hasslacher Chemical Company.

The first sales offices of the company were at 56 Pine Street, New York, but very shortly they moved to 73 Pine, and after twelve years to 100 William Street, which, with the Drug and Chemical Club on the top floor, was for many years, before the post war exodus of the chemical companies into the midtown area, the heart of the chemical district. It was after the war, indeed after the retirement of both the original partners, in 1921, that the headquarters were moved uptown to 709-717 Sixth Avenue, opposite Bryant Park.

From its founding in 1885 to the time of the World War, Jacob Hasslacher was active head of the company. While his immediate personal concern was the commercial end of the business, nevertheless he kept in

Original buildings of the company at Perth Amboy, N. J., 1884.

Company dinner given in honor of Hugo Du Bois. At the head of table, left to right, Dr. H. R. Carveth, Dr. L. H. Backeland, Jacob Hasslacher, Hugo Du Bois, Franz Roessler, John K. Creevey, William A. Hamann.

close touch with plant operations, and all new projects and all important negotiations came to his desk. However, he had been bringing up carefully trained associates. While before the war the staff which chiefly assisted Mr. Hasslacher and Mr. Roessler was William A. Hamann and Hugo Du Bois in the commercial end of the business, John K. Creevey, attorney, and Dr. Hans Foersterling in the technical department, others came more prominently into the picture during the war period. Philip Schleussner became Sales Manager as other burdens fell on Mr. Hamann, and Dr. Hector R. Carveth succeeded Dr. Foersterling. Constructive leadership in research and production was furnished at the Perth Amboy unit by B. S. Lacy, Sterling Temple, and L. M. White and at Niagara Falls by E. A. Rykenboer, Earl A. Harding, H. N. Gilbert, and P. J. Carlisle.

The World War inevitably brought considerable expansion of manufacturing capacity to the R & H enterprise. The dislocation of world chemical trade also wrought an important and far-reaching change in the set-up of the corporations. Throughout a busy quarter-century, the policy of manufacturing chemical specialties at first imported, as soon as American demand justified the capital investment in plant, had gradually, but definitely, brought to The Roessler & Hasslacher Chemical Company a great measure of independence from their foreign connections. While relations with their foster company, the Deutsche Gold-und-Silber Scheideanstalt were always upon the most friendly basis of mutual cooperation, nevertheless both Jacob Hasslacher and Franz Roessler cherished this independence. They not only adopted the policy deliberately formulated to promote it, but also on more than one occasion they had protected it by insisting that the American business, both in plant and office, be placed unreservedly under their management. The wisdom of this policy was rather spectacularly proved when the war abruptly cut off European chemical supplies. R & H was able to carry on, even to advance, under conditions that seriously handicapped many old firms wholly dependent upon imported chemicals.

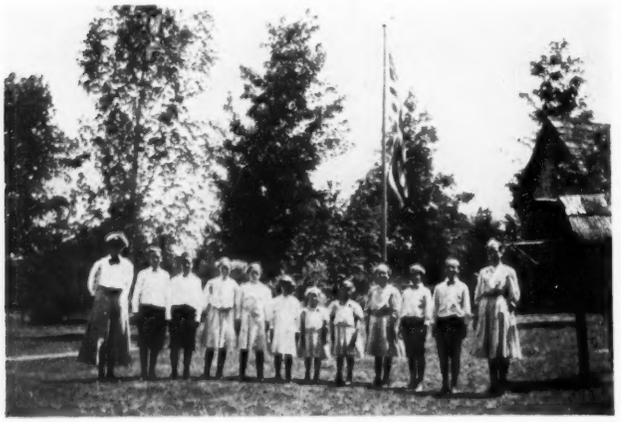
Their independence thus vindicated, the heads of the company, a year before the United States entered the conflict, felt justified in seizing the opportunity to make that independence legal and financial, as well as chemical and managerial. Accordingly, they sent a representative to Germany, commissioned to purchase at a fair price any stock in the American company that members of the Anstalt group were willing to sell. They were able to buy sufficient shares to secure control.

After the United States entered the war, when the validity of this stock purchase was being questioned, young Joseph Choate, as attorney for the Alien Property Custodian, visited Mr. Hasslacher at his summer home. They talked for a long time on the broad verandah with its superb view of the rounded shoulders of the Catskill Mountains that Jacob Hasslacher loved so well. At the time he was recuperating from an attack of the same illness which four years before had forced him to curtail his business activities, and he had just received word that his oldest son had been transferred from the U. S. Engineers to the Chemical Warfare Service. He mentioned neither fact, for characteristically he disdained to mix sentiment with business. Mr. Choate was endeavoring to establish the motives of that stock purchase a year previous.

"Naturally," said Mr. Hasslacher summing up, "it was a friendly transaction. They had furnished the

original working capital that enabled us as young men to get in business for ourselves. More than that they had trained us in the business. They for years had given us good advice and technical assistance. For years we had bought from them and sold for them. Among them we had several close, personal friends. But, Mr. Choate, there was nothing friendly about the negotiations as to price and terms. That was all strictly business, though I do not mind telling you now that we would have paid more for the stock, if we had to, and we would have liked to have bought more of the stock, if they would have sold it."

Not till two years after Mr. Hasslacher's death did the Alien Property Custodian concede the legality of that purchase. In 1918, the shares owned by the Anstalt interests were taken over by the Alien Property Custodian. These shares, with the consent of the Scheideanstalt, were sold several years later to a group



A gathering of the Roessler and Hasslacher children at Elka Park, N. Y. Left to right, Ria, Hans, Fritz, Lily, Ann, and Emma Roessler; Emily, Thea, Antonia, Carl, George, and Agnes Hasslacher.

of R & H officials who in turn distributed them to employees and the other American stockholders. The Company thereafter continued to be one hundred per cent. American owned.

On January 1, 1920, Jacob Hasslacher laid down the reins. He was far from well, and after so many years of strenuous service, he sought rest and the restoration of his old super-abundant health. In earlier years he had never been sick, and it was a long-standing family joke that he recognized but two illnesses, pneumonia and broken bones. Yet he never fully recovered, and fourteen months later, on March 15, 1921, he passed peacefully away at his home in New York City.

Throughout his active life, business controlled but did not monopolize his interests. So warm-hearted and generous a man could not but devote a great deal of time to his friends and family, and also during the later years of his life particularly, he was a moving spirit in the organization and administration of Elka Park, a residential reserve in the Catskill Mountains, where for many years the Hasslachers had their summer home. Here and at his residence in New York, he delighted hospitably to gather together his personal friends and business associates at dinner parties and all sorts of informal gatherings.

In all his hospitalities, Mrs. Hasslacher, who before her marriage had been Miss Elizabeth Fleck, most charmingly played the hostess. They had a large family: two sons, George and Carl, and four daughters, Agnes, Antonia, Thea, and Emily. Always they were a closely-knit family group. He was a devoted father, playing and working with his children, going off with them on long walks, visiting museums, taking them to the theatre and opera, entering into their interests, training them, encouraging them.

Christmas was the great holiday in the Hasslacher family, and every year at this season all of the stray bachelors of their acquaintance were gathered together into the family festivities. During the very last Christmas season that he lived to enjoy so thoroughly happened an incident which made a deep impression on the men of the R & H organization who took part in it. At that time of the year, the sales staff had been called together from all over the country for a conference at headquarters. Learning of this, Mr. Hasslacher sent word that he wanted "his boys" to come up and see him.

Headed by Philip Schleussner, the managers of the various R & H sales offices from all over the country went up to his home. There was Alfred Stepan from Chicago, August Goerner from Boston, Carl Dittmar from Cleveland, Milton Kutz from Philadelphia, and William Stoll from San Francisco. Sitting in an invalid chair, he received them by an open fireplace.

He plied them with questions about customers that he knew well and conditions with which he had once been so closely in touch. He gave good advice on their problems and laughed heartily at their jokes. Plainly, he was itching to be back in the thick of the sales battle. It was quite plain to all of them that only a miracle could again make him their active commander-in-chief. Port and Christmas cookies were served and he proposed a toast for the coming year to a better sales record for R & H, and "his boys," gray-haired veterans most of them, drank a hearty toast to his own good health.

Amid cheery Christmas greetings, the little party broke up. Most of them never saw him again. All carried away an indelible picture of an alert, courageous leader; a warm, honest friend.

Potash Production 1935

Potash produced in the United States last year is estimated by J. W. Turrentine, president, American Potash Institute, as the equivalent of 213,000 short tons of potassium oxide, or an increase of about 100,000 tons on 1934. The output was mainly in the form of high-grade muriate, approximating 60 per cent. potassium oxide.

Antimony as a Raw Material for the Chemical Industry

By Charles Hardy

President, Charles Hardy, Inc.

ANTIMONY occurs in nature principally in the form of the sulfide and the oxide; the most important minerals are stibnite or gray antimony ore (Sb_2S_3), kermesite or red antimony ($2Sb_2S_3$, Sb_2O_3), valentinite or white antimony and senarmontite (Sb_2O_3). It is also found in a number of ores of gold, lead, silver, etc.

Antimony has long been known in various forms, particularly in the East. The "kohl" used by the ancients, and still used by the Egyptians and Arabs, for painting their eyebrows, is antimony sulfide. Antimony is referred to in the Old Testament, Ezekiel XXIII, 40, as "stibis," stibium. In Wang's book on antimony, indications are given that even the art of melting and refining the metal was known at an early date. Paracelsus in the 16th century used antimony for medical purposes.

Antimony (Sb) has the atomic weight 121.76, a melting point of 630° C., and a boiling point around 1635° C. Its specific gravity is 6.68 and its valence 3 or 5. The metal is silvery gray and exceedingly brittle. It has a crystalline structure.

Antimony undoubtedly occurs in a great many locations, but only in the following countries (in alphabetical order) is it found in sufficiently large quantities to make the exploitation of the deposits economic: Algeria, Bolivia, China, Czechoslovakia, France, Mexico and Turkey. Far and above the production of all other countries is that of China, which during the last ten years has varied from ten thousand tons per annum minimum to twenty-two thousand tons maximum. Next in importance have been Bolivia and Mexico. The production figures of recent years are best shown below.

Very little mining of antimony ore is done in the United States, therefore we import most of what we consume. The second important domestic source of antimony is secondary metal, recovered from old alloys, scraps, dross, etc. The table on the next page gives the antimony statistics for the United States during the last years.

World Production of Antimony

(In metric tons of recoverable metal content of ore, exclusive of antimonial lead ores)

Country	1925	1926	1927	1928	1929	1930	1931	1932	1933
North America:									
Mexico	1,398	2,614	1,924	3,578	2,925	2,882	5,443	1,738	1,950
United States	24	31	.....	30	.....	.....	.....	82	533
South America:									
Argentina	10(1)	(2)	(2)	(2)	(2)	.....	.....	.....	.....
Bolivia	1,384	3,260	3,593	2,834	3,023	1,160	1,348	1,469	1,896
Peru	14	79	89	112	104	47(1)	24(1)	31	40
Europe:									
Austria	.....	87	857	914	560	(3)	.....	.....	.....
Czechoslovakia	578	1,154	1,951	967	673	372	565	577	.....
France	648	580	1,470	893	1,025	1,106	516	305	.....
Italy	312	443	500	230	293	330	269	412	370
Portugal	15	(2)	(2)	(2)	(2)	(2)	.....	.....	.....
Spain	.....	50	38	25	.....	.....	.....	.....	.....
Jugoslavia	139	182	147	258	313	3	68	.....	.....
Asia:									
China	19,496	20,926	17,986	19,324	22,401	17,419	9,842	13,171	13,933
Turkey (Asia Minor) (1)	400	400	400	95	7	16	41	.....	45
Africa:									
Algeria	1,461	334	50	21	114	(3)	282	261	.....
Morocco, Spanish	.....	70	94	225	180	(3)	80	.....	.....
Australia:									
New South Wales	12	34	64	48	25	68	66	60	48
Victoria	54	68		1	2	(2)	(2)		

(1) Exports.
(2) Data not available.

Trend of the Antimony Market

(Cents per pound)

	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
Open	25.00	12.50	10.85	9.75	8.50	7.125	6.15	5.40	7.25	14.11
High	25.00	15.50	11.375	9.75	9.25	7.50	7.00	7.50	13.75	15.32
Low	9.50	10.25	9.50	8.25	6.75	6.00	5.00	5.40	7.15	12.5
Close	12.50	10.875	9.75	8.25	7.125	6.15	5.40	7.25	13.625	13.82
Average	15.99	12.39	10.305	8.956	7.667	6.720	5.592	6.528	8.901	13.62

As a metal antimony finds many applications as an alloying element, particularly in lead-antimony alloys, with percentages of antimony varying from 1—20%, used for batteries, bearings, type metal, cable sheathing, solder, hard lead, and numerous smaller applications. An estimate for the consumption of antimony for the different uses for the year 1930 is given in the following table according to the U. S. Bureau of Mines, Office Memorandum, Series 211:

	Tons	Per cent.
Bearings	3200	16.0
Batteries	6500	32.5
Cable Covering	600	3.0
Soft Metal Alloys and Solder	1000	5.0
Hard Lead	500	2.5
Type Metal, etc.	3000	15.0
Ammunition	1200	6.0
Enamels, Chemicals and Paints	2000	15.0
Miscellaneous	1000	5.0
	19,000	

The list of antimony chemicals is formidable, as the metal forms a number of oxides and salts with inorganic and organic acids.

Antimony Chloride (butter of antimony; antimony trichloride; mineral butter), $SbCl_3$, is a colorless, transparent, crystalline mass, very hygroscopic and corrosive. Butter of antimony is a clear, strongly caustic liquid with an acid reaction. Sp. Gr. 1.35 = 38° Bé.

Antimony chloride is usually produced by treating the metal with chlorine. It can also be made directly from stibnite, either with hydrochloric acid or with chlorine, or from natural antimony oxide. It is used as a raw product for the preparation of other antimony salts; *i.e.*, antimony fluoride and antimony sulfides. For these purposes it is not necessary to isolate the salt, but the solution of antimony sulfide or oxide in hydrochloric acid is used directly. The chloride as such is used for bronzing iron and coloring zinc black. Another important application is as a catalyst in organic reactions since it forms antimony pentachloride ($SbCl_5$) with chlorine.

Antimony pentachloride is a colorless or slightly yellowish liquid, fuming in air, heavier than water, which disintegrates into antimony trichloride and chlorine at 140° C., and therefore used to introduce chlorine into organic compounds.

Antimony oxychloride (SbOCl), a white amorphous powder, or small bright needles, soluble in HCl and acetic acid, was, but is no longer used, as a pigment.

Antimony fluoride (SbF_3) is generally produced from antimony trioxide and fluoric acid. This fluoride is soluble in cold water without hydrolysis. Its great importance lies in the formation of double salts which are used extensively as mordants in the dyeing, printing, and tanning industries. The so-called antimony salt of De Haen is a double salt of antimony fluoride and ammonium sulfate. Besides, a double salt of antimony fluoride and sodium chloride and a number of other double salts are used.

The antimony oxides are by far the most important of the antimony chemicals. Their consumption constitutes more than 90% of all the antimony compounds. There are three antimony oxides: antimony trioxide, Sb_2O_3; antimony tetroxide, Sb_2O_4; antimony pentoxide, Sb_2O_5. Particularly the trioxide and the tetroxide are commercially important. The trioxide occurs naturally as valentinite and senarmontite, but most oxides are produced in various chemical ways. One process is to roast the natural stibnite. With little air the trioxide is obtained, while with an excess of air one obtains tetroxide. The oxide manufactured in this way is usually impure and contains some arsenic. If a pure oxide is desired, the impure oxide is dissolved in hydrochloric or sulfuric acid and the oxide precipitated from the hot solution with water. Another method for making a very pure oxide is by blowing air over molten antimony and collecting the oxide in a chamber. Thousands of tons of tetroxide are used as paint pigment and in vitreous enamels as a coloring and opacifying agent. Antimony oxide serves as a substitute for the more expensive tin oxide. In the ordinary white ground coat it produces a brilliant opacifying effect. Recently another antimony chemical has gained some

Antimony Statistics of the U. S.

(In tons of 2000 lbs.)

	Imports, Antimony Content (a)			Production (b)				
				In hard lead			Secondary Recovered from old Alloys, Scrap, Dross, etc.	
Year	Crude, Needle, Metal or Regulus	Ore	Type Metal and Hard Lead	In Domestic Ore	From Domestic Ore	From Imported Ore (f)		Total
1925	10,617	773	(e) 900	33	1,972	652	10,840	25,102
1926	13,546	1,559	(e) 814	43	2,383	310	16,230	34,532
1927	10,968	2,015	(e) 120	Nil	2,736 (d)	...	12,400	27,879
1928	10,892	2,185	(e) 450	42	3,432 (d)	...	11,900	28,859
1929	12,876	1,865	(e) 300	Nil	3,052 (d)	...	11,131	29,224
1930	8,413	863	(e) 70	Nil	1,685 (d)	...	8,082	19,113
1931	4,403	4,863	(e) 84	...	964 (d)	...	7,900	18,214
1932	1,943	1,328	(e) 1	419	878	207	6,450	10,600
1933	2,641	2,128	(e) 301	587	927 (d)	...	7,400	13,397
1934	2,122	2,891	(e) 782	...	....	...	7,550	.....

(a) Imports for consumption. (b) Metallic antimony; figures of U. S. Bureau of Mines. (d) Includes both domestic and foreign ore. (e) Estimated. (f) Not included in total, since it is already covered under imported ore.

importance in the enameling industry, that is sodium antimoniate. Antimony trioxide is used in the glass industry as a coloring agent and also in the manufacture of tartar emetic.

The importance of tartar emetic ($KSbOC_4H_4O_6$) has decreased considerably. It is now hardly used in medicine or as a mordant in dyeing where it has been largely substituted by the double fluorides.

The last important group of antimony chemicals are the sulfides. The so-called antimonium crudum, which is a rather pure antimony trisulfide, usually contains more than 97% Sb_2S_3. It is obtained in the first step in refining antimony by liquation of the ore. Ground antimonium crudum is used for the manufacture of matches, for white flares in pyrotechnics, and in the production of ruby glass.

The amorphous antimony sulfides and antimony oxysulfides are called sulfuret of antimony and used for yellow, golden, and crimson pigments for the paint industry. Their chemical composition varies considerably according to the manner of manufacture. Some of them contain several per cent. of free sulfur. There are two important methods of producing these pigments: from antimony chloride by precipitation with sodium hyposulfite, or by dissolving antimonium crude in a hot solution of sodium sulfide with the addition of sulfur. By the latter process one obtains the so-called Schlippe's salt, Na_3SbS_4, which is in turn decomposed by sulfuric acid to give the yellow or red pigment. Until recently, large amounts of antimony sulfides were used in the rubber industry in the process of vulcanization, but this use has fallen off considerably on account of the relatively high price.

The prices for antimony compounds are naturally controlled by the price for the metal, which in turn depends chiefly on the supplies of the Chinese producers and the demand of the users of antimony alloys. The table on opposite page gives the trend for the antimony market during the last years.

References:

The Metal Industry, Vol. 43 (1934), edited by G. A. Roush.
Ullman, Enzyklopaedie der Technologischen Chemie, Vol. 1.
Reports of the U. S. Department of Commerce.

N. P. V. & L. A. Membership Drive

N. P. V. & L. A. is in a nation-wide drive for new members. A brilliantly colored broadside, the cover of which carries a cartoon of the paint industry astride a caterpillar military tank, labeled National Paint, Varnish & Lacquer Association, and which bears the Association's building on its back, and is pounding its way up a mountain to a pinnacle of paint profits, with a caption, "The Paint Industry Making the Grade in '36," has been mailed both to members and non-members of the Association, as part of the drive.

The deferred payment painting plan is featured in a unique, attention-getting way, on the first inside fold. When fully extended, the Association building is shown with radio broadcasting towers, with pertinent information about the respective Associational activities at the terminations of electrical flashes. The general caption of this display is: "Your Association in Action in '36."

Sulfur from Sulfide Minerals

Russia is building up a sulfur industry employing sulfide minerals. Fundamentally, methods are similar to those adopted in Norway and Spain, and, to a smaller extent, in England, in that they depend upon the reduction of the sulfur dioxide content of the roaster gases of the sulfide minerals. In details, the Russian processes offer interesting points of divergence.

Pavlov and Lesochin, Chemical Technical Institute, Leningrad, have been testing the utilization of the pyrrhotines which are widely available in the U. S. S. R., and which contain from 15 to 42% of sulfur. By calcining pyrrhotine in a current of hydrogen, 96.6% of the sulfur content was obtained in the form of hydrogen sulfide. By replacing hydrogen by steam, superheated to 300° C., about 95% of the sulfur was recovered, 60% as hydrogen sulfide, and 35% as elementary sulfur. By passing over the ore under calcination a mixture of steam superheated to 300° C. and a current of air, 96% was recovered, 60% in the form of the element. Yield of free sulfur was increased by calcining the pyrrhotine with 40% of its weight of carbon. Mineral used had a sulfur content of 30.2%.

Some years ago, Juskevich investigated the possibility of producing elementary sulfur by the reduction of sulfur dioxide with carbon monoxide. Trials were carried out in a semi-industrial plant at Kalata, and the process proved promising when carried out in the presence of catalysts. Catalysts of the bauxite type, particularly one with a composition 26.7% ferric oxide and 73.3% aluminum were most effective. This work has now been resumed by Pascevskij and Tabunov, at the Urals Chemical Institute. These workers employed as catalyst solid porous preparations of bauxite from the deposits of this mineral that were discovered in Nadezdinsk (Urals) 5 years ago. Yields of elementary sulfur varying between 92 and 98.4% of the theoretical were obtained. The porous type catalyst proved the most effective.

Combined production of elementary sulfur and of sulfuric acid by the treatment of sulfur dioxide with water has been studied by Makovezky and his collaborators. Reactions are represented in the following equations:

$$3SO_2 + 2H_2O = H_2S_2O_4 + H_2SO_4$$

$$H_2S_2O_4 = H_2SO_4 + S.$$

Trials were carried out with sulfur dioxide solutions of the following concentrations: 3.69%, 5.47%, and 8.46%. Solutions were prepared in glass ampoules hermetically sealed. Ampoules were immersed in autoclaves and temperature raised gradually to between 150° and 170° C. After cooling, ampoules were broken in a receptacle containing cold water and content of the solution produced analyzed. Experiments are reported as having given the following results: Reaction between sulfurous acid and water increases with increase in the pressure and temperature. Quantity of sulfur dioxide transformed into trioxide is a function of the temperature, the pressure and the length of heating. A conversion of 74% was found after 12 hours' heating at 175° under a pressure of 11 atmospheres. Proportion which the amount of sulfuric acid made in this reaction bears to the quantity of sulfur is about 6 to 1. Reaction is markedly accelerated by the presence of selenium catalysts. Industrial possibilities of this process are now being investigated by Kuzmin and Postnikov at the Ivanovsk Chemical Technological Institute.

A further interesting development, due directly to Kuzmin and Postnikov is in the production of elementary sulfur by the decomposition of the ammonium salts of sulfurous acid. This decomposition, represented in the following equation, takes place

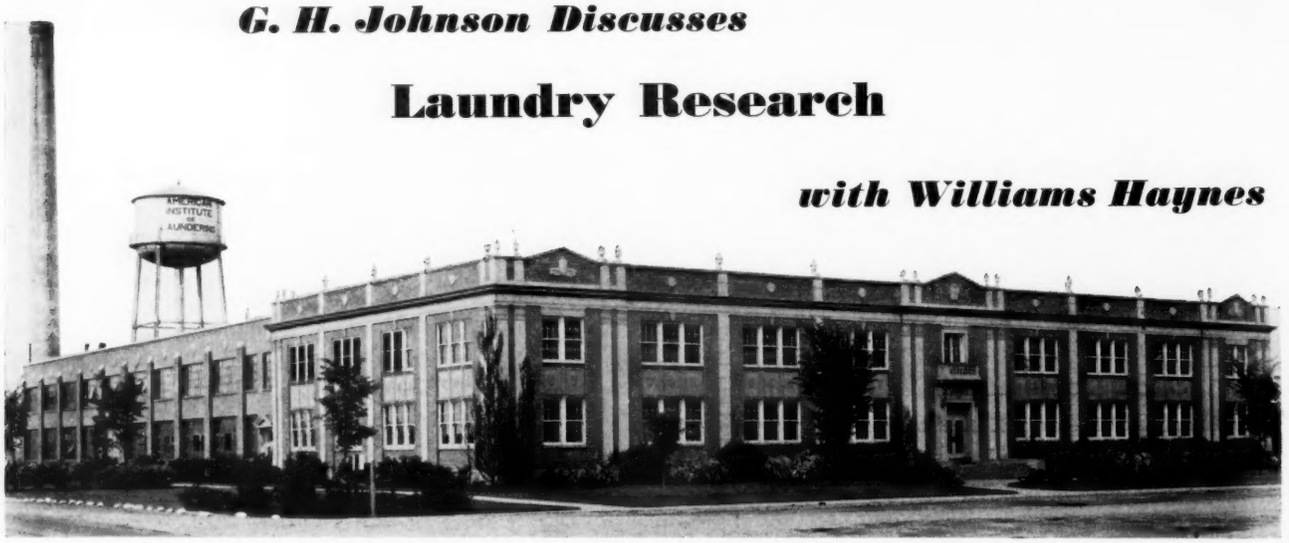
$$(NH_4)_2SO_3 + 2NH_4HSO_3 = 2(NH_4)_2SO_4 + H_2O + S$$

with high velocity at relatively low temperatures, and is largely independent of the concentration of the solutions. Amount of elementary sulfur produced is about 10 times as great as that in the process of Makovenzky. *Chemical Trade Journal*, London, Jan. 24, p61.

G. H. Johnson Discusses

Laundry Research

with Williams Haynes



LAUNDRY trade might well be called the "safety razor business" of the chemical industry. It is a constantly repeating, small-unit sale to some six thousand laundries scattered throughout every city in the land.

Yet the gross annual chemical consumption of the American laundries, if it might be fully tabulated, would not compare badly with the chemical consumption of the great steel industry or even our total chemical exports.

Let us check over briefly the chemicals used in the power laundry. The five basic ones—called by the laundrymen "detergents"—are caustic soda, soda ash, modified sodas (chiefly the sesquicarbonates), trisodium phosphate, and the meta-, ortho-, and sesqui-silicates. But, although the most important, these only begin the list of laundry chemicals. For "sours" the laundries use acetic acid (both 56 degree and glacial grades), oxalic acid, more rarely formic acid, while for years they have been increasing their consumption of sodium and ammonium acid fluoride and also sodium and ammonium fluosilicate. The favored bleaching agent for white cotton and linen is sodium hypochlorite and for removing stains they employ as reducing agents the hydrosulfites. For bluings the modern laundry has left ultramarine and Prussian or cobalt blues and under careful chemical control employs dyestuffs of the basic or acid type with a small but growing use of vat dyes.

The Photometer, used in making whiteness reflectancy tests, being demonstrated at Laundryowners National Association Headquarters.

George H. Johnson, Director of Research, at the Institute.

All these are strictly chemical products, and to them must be added the soaps, of which a wide variety are bought, each for specific operations: For high temperature washing, 38°-42° titer, tallow soap in both chip and powder; for low temperature, 20° titer or less, olive oil or red oil soaps. Neutral soaps (basis 88-92 per cent.) and "built soaps," in which the alkaline detergent is ready-mixed, are also purchased in quantities. Finally, there are the starches—corn, wheat and rice, straight or in various mixtures. From soap and detergent to starch and bluing, all these chemical products are known to the laundry buyer as "supplies". In addition, considerable salt is used for the daily regeneration of zeolite softeners. In a few instances, lime, soda ash,

and alum, or sodium aluminate, are used for water-softening purposes.

So formidable a list of chemicals used in washing clothes might well raise in the mind of a layman those same fears that for years prejudiced the textile trade against bleaching with chlorine, yet such skepticism is unwarranted, for the modern laundry uses these supplies with discretion; or rather, it is working intelligently with chemical agents under strict conditions of chemical control. Incidentally, these supplies are no different from those used under home conditions. For this exact knowledge and the approved means of applying it to practical washing, the laundry industry and all of us who are their weekly customers are indebted to one of the most unique research organizations in the country, the American Institute of Laundering at Joliet, Illinois.

An industry composed of many small units, each unable to afford a laboratory and scientific staff, sorely needs some centralized bureau of research. Since each laundry serves but a local community, the industry as a whole is peculiarly non-competitive, so that cooperative research is a feasible as well as a practical undertaking.

In this wise, reasoned a group of broad visioned laundryowners many years ago. The beautiful, efficient building of the Institute of Laundering, its plan and program are practical realizations of this vision. It was Theodore Roosevelt who once said that "every man owes something to the trade at which he works." Wm. E. Fitch, a laundryowner himself, served his industry for more than twenty years as manager of its trade association. He, with J. Clair Stone of St. Paul, Minnesota, conceived the idea of the Institute. Many leaders in the industry labored for years to make that idea a reality.

Two of the keymen Mr. Fitch recruited to this work, Lloyd A. Peck, General Manager, and George H. Johnson, the Director of Research, summarized the well thought out plan upon which this unusual research organization has been built. We were sitting in the sunny cafeteria of the Institute. The crowd of chatting girls had gone back to the big laundry room. The little group of serious-minded students in the laundry school had filed back to the laboratories. We were alone and the big room was suddenly quiet.

Said General Manager Peck: "Most laundryowners are practical men, and Mr. Fitch and his committee wisely foresaw that if this Institute were to succeed it must operate a real laundry, doing commercial work at regular rates and under average operating conditions. It was desirable that it be centrally located. It would be a better test if it could be located in a hard water zone. It is unthinkable that the Association should set up a publicly owned, cooperative model laundry in competition with any of its own members.

"Joliet was the answer to these requirements. Geographically correct, supplied with 'hard water,' it was possible here to buy out the existing commercial laundries.

"So the heart of our research is a regular plant-scale operation, a practical, commercial laundry serving a city of 46,000 inhabitants. Here we can actually test out, under actual working conditions, the results of studies in the laboratory or experiments in our separate research plant, which, incidentally is the miniature laundry where our students actually run the various standard types of laundry machinery. While we must train men and conduct many trials, at the same time we dare not experiment with our customers' bundles—and we don't. Our position is just like any other laundry in this respect; that is why our findings are so valuable and our recommendations carry more and more weight, but all this is really the work of our Research Department, and George Johnson is in charge."

So off I went with the Director of Research who, so I only learned from his colleagues, was a student of

Experimental Research Laundry.

Olney's at the Lowell Textile Institute, and is the author of "Textile Fabrics." Fortunately for my readers, this exceedingly modest chemist is so enthusiastic about his work that he talks about it freely, if quite impersonally.

He showed me the big, practical laundry and the smaller research laundry. He took me through the power plant and the general laboratories. He ushered me into the individual laboratories where special apparatus tests fading and whiteness and the tensile strength of fabrics before and after washing; and throughout this tour, he discussed laundry research.

"Our first and foremost objective is to improve practical laundering technique. To this end we are constantly experimenting with changes in method and supplies, and trying them out with all possible variations of time and temperature and in many combinations, in order to work out practical working methods we can recommend to the members of the Laundryowners National Association of the United States and Canada.

"In the routine of carrying on such tests we may come, from time to time, upon corrections or desirable modifications in the directions given out by manufacturers. Quite unofficially, we pass these along. More rarely, we discover what are pretty clearly misstatements of fact or claims which cannot be substantiated. In these cases, we privately call the attention of the manufacturer to our findings. Nine times out of ten the necessary correction is made at once.

"We make no endorsements of supplies. This policy has been adopted for the good and sufficient reason that we have neither time nor facilities to test completely and compare accurately all brands. Yet, very naturally, we have had literally hundreds of requests to test out all sorts of chemicals and specialty formulas. If we attempted to make these tests, we could work treble our present staff about twenty-four hours a day, and it does not seem fair to us that such trials should all be made at the expense of the customer, for remember, this Institute is owned by the laundry industry and run for its benefit.

"To meet this situation, four years ago we established a system of Fellowships under which we lay out a program of determinable tests to be sponsored by a supply company, and the company's own technician works with our staff, using Institute facilities. Usually this work is to determine exactly how best a certain product may be used in commercial laundry technique."

At the time of my visit, three such Fellowships were in force: since September, Mr. Lloyd Howells, of Cowles Detergent Company, had been experimenting in order to discover just the most efficient ways to use their products; since January 15, George Wolfe and R. Propst, under the direction of H. G. Smolens, all of Becco, have been working upon the use of hydrogen peroxide in laundry work, and the latest comer was S. S. Snell, of A. E. Staley Manufacturing Company, investigating starch practice.

Other companies which have from time to time engaged the research facilities offered here are the Hercules Powder Company, testing their pine oil detergent, Daintex; Calgon; Mathieson Alkali, two tests on their HTH and on bleaching practice in general, the latter so broad a test that it resulted in two industrial reports with the joint signatures of the company and the Institute; Corn Products Refining Company, on starch; Sterling Products Company, on their branded detergent, Erusto-Lax. Another type of test is run on fabrics and garments, which are repeatedly laundered under standard conditions, with accurate reports of the results at every step in the operation.

"We have had a very interesting experience recently," said Mr. Johnson, as we returned to his office. "A company brought here for trial a new detergent which they enthusiastically believed was going to revolutionize laundering practice. Jointly we submitted it to exhaustive tests. It proved to be nothing at all remarkable. The company decided to drop it; thus they saved themselves the cost of trying to introduce an ordinary product which could never have become a great commercial success. They certainly made a wise investment in the few hundred dollars that they paid as two-months' Research Fellowship fee."

As I rode away on the train from Joliet, I marvelled at all I had seen and heard and taking out the form Mr. Johnson had given me, I read over carefully the terms of the Laundryowners National Association Research Fellowship agreement. It is a notably clear and simple document affording full neutral protection. Surely, I thought, there are advantages to chemical research carried on under the auspices of the customers.

Phosphate Rock 1935

Producers of domestic phosphate rock in '35 reported gains of 8 per cent. over '34 in total mine production (3,090,974 long tons); 6 per cent. in total tonnage shipped or used (3,009,876 long tons); and 7 per cent. in total value of shipments ($10,752,568). In '35 phosphate rock, by kinds, was produced in the following states: Hard rock, land-pebble, soft rock, phosphatic clay, waste-pond debris, from Florida; blue, brown, white, and gray rock from Tennessee; western rock from Idaho and Montana; and apatite from Virginia.

Preliminary figures reported by the Bureau of Mines in January, 1934, on total shipments of phosphate rock in the United States in 1934 were within 1.5 per cent. in quantity and 0.006 per cent. in value of the final figures.

In '35 shipments of phosphate rock from Florida and Tennessee amounted to more than 95 per cent. of the total tonnage. Total stocks in producers' hands on Dec. 31, '35 (1,235,276 long tons) increased 18 per cent., compared with the preceding year. The average value of the rock per long ton at the mines in '35 was $3.57; in '34 it was $3.54.

Imports of crude phosphate rock into the U. S. in '35 were reported by the Bureau of Foreign and Domestic Commerce as 100 long tons of crude rock, valued at $900. Imports of apatite were 3,599 tons, valued at $28,829. No imports of phosphate rock into the U. S. were recorded for '34.

Total exports of phosphate rock in '35 amounted to 1,105,394 long tons, valued at $5,773,506.

Data on production, shipments, and stocks are based on eleven months actual figures from records of producers, plus estimates by them for December, '35. Import and export figures are for the twelve-month period of '35 and are subject to revision.

Comparative Values of Tanning Extracts

By John Arthur Wilson, Sc. D.

FOR tanners of heavy leather, the writer has selected ten typical samples of the most widely used vegetable tanning extracts, in order to ascertain more about their relative tanning values and penetrating powers.

A hide was put through the beamhouse in the sole leather method and rectangles cut from the butt so as to give reasonably representative and comparative samples. These were suspended in the tan liquors in flat battery jars having width and depth slightly greater than the width and length of the hide pieces, corresponding roughly to the proportions commonly found in rocker vats. Each piece was suspended first in a tan liquor of 0.5% tannin (A. L. C. A. Method) and left for two days. The liquor was then run away and replaced by one of 1% tannin. Thus, the strengths of the liquors were increased by 0.5% tannin every other working day until a tannin strength of 6% was reached. The pieces were left in this strength of liquor until the total time in all liquors reached 42 days. Then they were removed from the liquors, oiled lightly on flesh and grain to prevent oxidation, and dried slowly. When air dry, they were analyzed.

Nine tests were made in which the following extracts were used alone: cutch, chestnut wood, hemlock bark, oak bark, valonia, wattle, myrobalans, raw quebracho and bisulfited quebracho. The bisulfited quebracho was made from the raw quebracho by treatment with 3% by weight sodium bisulfite. Some of the extracts were also used in mixtures with other extracts in equal parts on tannin basis. Spruce, a sulfite-cellulose extract, was used only in mixtures with other extracts, as it is not ordinarily used alone.

The tanning time of 42 days was regarded as sufficient for comparative purposes, as it allowed more than a week's contact of hide and liquor after even the slowest extract had completely penetrated the hide.

Values in Table I are given on the dry basis in order to make them more readily comparable. A column is added, giving the so-called "purity" of the extract in terms of parts of tannin per 100 parts of soluble solids.

TABLE I.

COMPOSITION OF EXTRACTS USED IN TESTS

As Determined by the A. L. C. A. Method

Extract	Analysis on Dry Basis — Tannin	Non-Tannin	Insoluble	Ash	Parts Tannin per 100 Parts Soluble Solids
Cutch	77.9	21.0	1.1	6.3	78.8
Chestnut wood	68.1	30.6	1.3	1.1	69.0
Hemlock bark	56.4	29.4	14.2	9.3	65.7
Oak bark	50.9	39.5	9.6	3.3	56.3
Bisulfited quebracho	82.6	13.5	3.9	3.0	86.0
Valonia	67.8	30.2	2.0	4.5	69.2
Wattle	75.3	22.8	1.9	1.9	76.8
Raw quebracho	81.1	10.1	8.8	0.7	88.9
Myrobalans	60.8	32.6	6.6	4.2	65.1
Spruce	50.4	48.9	0.7	6.9	50.8

Table II gives data of interest to heavy leather tanners. The extracts and mixtures are listed in order of decreasing fixation of tannin by the hide and numbered from 1 to 20. The values for combined tannin are taken from the analyses of the samples and represent the number of parts of tannin fixed by 100 parts of hide substance. The final pH value is that of the strongest liquor (6% tannin) at the time the leather was taken out to be dried for analysis. The rate of penetration of the tan liquor into the hide was measured by making a cutting each day, and observing the depth of penetration of the color. The number of days required for the tan liquor to color the entire thickness of the gross section of leather was recorded as days to strike through.

The order for decreasing fixation of tannin by the hide, for the extracts used alone is cutch, chestnut, hemlock, oak, bisulfited quebracho, valonia, wattle, raw quebracho, myrobalans. The order for cutch, chestnut, bisulfited quebracho and wattle is essentially the same as that reported in an earlier paper.* In this earlier work, a much plumper steer hide was used, greatly increasing the number of days for the tannin to strike through the hide. Tanning time was set at 57 days, the results being:

TABLE II

Equal parts tannin basis of	Combined Tannin	Final pH Value	Days to Strike Through
1. Cutch alone	69.61	4.37	16
2. Chestnut alone	64.55	3.20	14
3. Cutch-chestnut-bis. quebracho	52.66	3.50	14
4. Cutch-bis. quebracho-spruce	49.25	3.42	22
5. Hemlock alone	46.48	4.28	19
6. Cutch-wattle-spruce	45.51	3.60	27
7. Cutch-chestnut-wattle	44.83	3.67	16
8. Oak alone	44.04	4.55	30
9. Cutch-raw quebracho	43.21	4.33	25
10. Cutch-chestnut-raw quebracho	42.44	3.62	17
11. Bisulfited quebracho alone	40.47	6.07	10
12. Cutch-wattle	40.30	4.37	18
13. Chestnut-wattle-bis. quebracho	39.92	3.53	14
14. Valonia alone	37.61	3.83	20
15. Wattle alone	37.15	4.76	11
16. Chestnut-wattle-raw quebracho	37.10	3.67	10
17. Cutch-wattle-bis. quebracho	36.29	4.42	14
18. Wattle-bis. quebracho-spruce	34.44	3.57	20
19. Raw quebracho alone	29.63	5.27	18
20. Myrobalans alone	27.45	3.13	33

	Combined Tannin	Final pH Value	Days to Strike Through
Cutch	38.36	3.12	over 57
Chestnut	38.72	2.94	37
Bisulfited quebracho	28.42	4.10	17
Wattle	28.30	4.10	18

The combined tannin value for the cutch is lower than the true value because the hide still had a raw, untanned streak when analyzed. Experience proved that the laboratory results are more nearly comparable with those of a sole leather tannery when a lighter hide is used. In the present work, the results for various mixtures were found to be practically the same as those obtained in full operation of a sole leather yard using 60-lb. steer hides.

Relation of pH to the Penetration of Tanstuffs

In the present work, no attempt was made to control the pH values of the tan liquors, and it will be noted from Table II that there is considerable variation in both pH value and in the time required for the tanning materials to penetrate the hide. As a general rule, for any given extract or mixture, the rate of fixation of tannin by the hide increases and the rate of penetration into the hide decreases with drop of pH value from 5 to 3. Other conditions remaining constant, the total fixation of tannin in limited time decreases with decreasing rate of penetration.

Thus the variation in values for combined tannin in Table II may be considered the result of variations in three factors: (1) pH value, (2) rate of penetration, (3) specific nature of the tanning material. To get a direct and quantitative measure of

* *Hide and Leather*, May 13, 1933, page 17.

the effect of the specific nature of the material, only those extracts or mixtures where the pH value and rate of penetration chance to be the same should be selected for comparison. Only one such case is shown in Table II:

	Combined Tannin	Final pH Value	Days to Strike Through
Cutch-chestnut-bis. quebracho	52.66	3.50	14
Wattle-chestnut-bis. quebracho	39.92	3.53	14

Action of Cutch and Other Wattle

In these two tests, all of the conditions are the same except that one contains cutch and the other wattle. Under these conditions, 32% more tannin is fixed by using cutch than by using wattle, this apparently due to the action of the tanning material itself.

In Table III, data from Table II have been rearranged to show more readily the comparative effects of the different extracts upon tannin fixation when each is used in mixtures with two other materials.

TABLE III

Equal parts tannin basis of	Combined Tannin	Final pH Value	Days to Strike Through
Chestnut-bisulfited quebracho—			
Cutch	52.66	3.50	14
Wattle	39.92	3.53	14
Chestnut-raw quebracho—			
Cutch	42.44	3.62	17
Wattle	37.10	3.67	10
Chestnut-wattle—			
Cutch	44.83	3.67	16
Bisulfited quebracho	39.92	3.53	14
Raw quebracho	37.10	3.67	10
Cutch-chestnut—			
Bisulfited quebracho	52.66	3.50	14
Wattle	44.83	3.67	16
Raw quebracho	42.44	3.62	17
Wattle-spruce—			
Cutch	45.51	3.60	27
Bisulfited quebracho	34.44	3.57	20
Wattle-bisulfited quebracho—			
Chestnut	39.92	3.53	14
Cutch	36.29	4.42	14
Spruce	34.44	3.57	20
Cutch-wattle—			
Spruce	45.51	3.60	27
Chestnut	44.83	3.67	16
Bisulfited quebracho	36.29	4.42	14
Cutch-bisulfited quebracho—			
Chestnut	52.66	3.50	14
Spruce	49.25	3.42	22
Wattle	36.29	4.42	14
Bisulfited quebracho-spruce—			
Cutch	49.25	3.42	22
Wattle	34.44	3.57	20
Cutch-spruce—			
Bisulfited quebracho	49.25	3.42	22
Wattle	45.51	3.60	27

Although our present data do not permit us to make allowances quantitatively for differences in pH values and rate of penetration, it is evident that the order of the various extracts for tannin fixation based upon the specific nature of the tanning material when used in mixtures is essentially the order for the tanning materials used alone, as given in Table II. In mixtures, spruce may be given a place between chestnut and bisulfited quebracho, although its effect upon slowing up the rate of penetration must be taken into consideration. Thus cutch heads the list with chestnut a close second and the others following in the order: spruce, hemlock, oak, bisulfited quebracho, valonia, wattle, raw quebracho, and myrobalans. *Hide & Leather*, March 14, '36, p24.

Alcohol-Gasoline Blends

The lively question of the desirability of alcohol-gasoline blends, and the recently announced plan for the erection of at least one plant in the Midwest for the production of alcohol from grain for the primary purpose of making available alcohol supplies for such blending, adds considerable interest to a group of papers on the subject delivered at the recent A.C.S. meeting held at Kansas City. Various shades of opinion are expressed, and the following digests give the pertinent points:

"Alcohol-gasoline is a distinctly inferior motor fuel in performance, consumption, and upkeep of motor. Difficult starting, slow acceleration, overheating of engines, and rougher driving can be expected. Increased maintenance cost will result from cylinder and valve wear, all-around corrosion, plugging fuel lines, and dissolving of car varnish. Higher anti-knock properties result from blends. Increased fuel consumption will be 60 per cent. of the volume of added alcohol. Economically, blending can result only in economic loss to society, and additional unestimated losses will result to the country at large from the political, moral, and health hazards." From "Alcohol Gasoline in Motor Fuel," by Gustav Egloff and J. C. Morrell, Universal Oil Products Co.

"During the past fifteen years there has been rapid expansion in the use of alcohols in motor fuel. Ethanol is most commonly used but methanol, isopropanol, and isobutanol have also been studied and to a small extent have been commercially employed, particularly in the formulation of racing fuels. Ethanol-gasoline blends containing 5 to 25 per cent. anhydrous ethanol by volume are the fuels most commonly used. These blends are used interchangeably with gasoline of equal anti-knock value and have found favor among consumers. The economic status of ethanol used in these blends is established by its anti-knock value and other favorable properties rather than by its value as a fuel alone. In many countries the economic analysis must also give consideration to the importance of power alcohol to agriculture and labor, its bearing upon national self-sufficiency, its relation to dwindling petroleum supplies and other national economic and sociological problems. There are no technical obstacles in the way of a large power alcohol development in the U. S., and there is little doubt that such a program will develop. There are, however, problems in the establishment of adequate acreages of suitable crops and others of similar nature which will have to be worked out during the first stages of the development of a power alcohol industry." From "Alcohol-Gasoline Blends," by Leo M. Christensen.

"Technical aspects of blending alcohol and gasoline discussed. In general, no significant change in mileage occurs with 10 per cent. or less alcohol. With 30 to 40 per cent., there is increased fuel consumption. With unchanged carburetor setting, alcohol blends result in loss of acceleration. With 10 per cent. alcohol blend, acceleration can be retained by readjusting carburetor, increasing fuel oil consumption about 4 per cent. Depending on properties of gasoline, 10 per cent. alcohol increases octane number from two to ten units, but increases volatility to extent that in hot weather butane content of gasoline would have to be decreased about 2 per cent. Alcohol with a slight amount of water will blend in summer-time but not in winter. Condensation of water from air might produce separation of alcohol in automobile tank. This is the most serious problem in handling alcohol." From "The Utilization of Ethyl Alcohol-Gasoline Blends as Motor Fuels," by Oscar C. Bridgeman.

"This paper deals with the power, fuel consumption, and other performance characteristics of internal combustion engines when using gasoline and ethyl alcohol as fuels. Theoretical analysis shows ideal possibilities ranging from 2.0 per cent. increase in power with gasoline compared to pure alcohol, to 8.6 per cent. increase with pure alcohol compared to gasoline, depend-

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ing upon mixture conditions." From "The Performance of Engines with Gasoline and Alcohol as Fuels," by L. C. Lichty and E. J. Ziurys.

Calcium Carbide as Motor Fuel

Calcium carbide, in place of gasoline for motor car fuel, is receiving the attention of two electrical engineering experts in Genoa, Italy. Calcium carbide was used to drive an ordinary automobile and attained the same speed as if gasoline had been used, with greater power on hills. The cost was only one-fifth that of gasoline.

Phosphorus Pentoxide Agent for Petroleum

Phosphorus pentoxide shows definite possibilities as a refining agent for petroleum, particularly for vapor-phase cracked distillates, with which it yields a product with a more or less pronounced increase in the octane number, according to research carried out in the laboratories of the Shell Development Co., Berkeley, Cal.

Textiles

Soromine WF, a new softening agent, announced by General Dyestuff, not only imparts a soft and smooth handle to the rayon or cotton treated, but also fills the rayon.

Month's New Dyes

General Dyestuff releases include: Fast Golden Orange Salt GR, which on Naphtol AS produces the yellowest shades so far possible, and have the very best all around fastness properties. Fastusol Grey LVGL, a straight product of very good fastness to light, recommended for dyeing rayon and cotton and leaving acetate effects clean. Palatine Fast Black SRN Extra New produces a jet black of good fastness properties on wool and silk and is also well suited for printing. Indanthren Yellow 4 GK Powder Fine for Dyeing, yields on vegetable fibres and rayon a greenish yellow of a fastness to light not previously achieved with the same shade in the Indanthren range.

Fast Silk Yellow G is a new Acid Yellow brought out by I.G., and offered to the trade by General Dyestuff. It draws very well from a neutral or even slightly alkaline bath and is therefore especially suitable for dyeing of tin weighted silk. It may also be used in the boil-off liquor, and has good fastness to light and washing.

Degumming Agent

Orthopol Concentrate, in no way related to the Kloranols or other sulfonated fatty alcohols except that it is not affected by hard water, etc., is used as a new product for the degumming of silk hosiery. American Aniline & Extract Co., Philadelphia, is producer.

Metals and Alloys

New electrolytic chrome-plating process uses sodium oxide as the electrolyte. Benefits claimed include (1) more efficient use of electric current, (2) protection of projecting parts of goods being plated, and (3) a smoother and glossier finish which is more ductile than the ordinary plate, though not quite so hard. Reported by Consular Clerk W. S. Jesien, Frankfort-on-Main, Germany.

New Alloy

An alloy which loses its magnetic qualities under heat but regains them upon cooling is a product of General Electric. Its commercial use is not yet known, but as the degree of heat at which magnetic quality is lost can be regulated, general use in several forms of heat control is indicated. Exhibited at the N. Y. Museum of Science & Industry, Rockfeller Center, N. Y. C.

Acid Proof Steel Process

Ihrigizing, a process for making ordinary steel extraordinarily resistant to corrosion, has recently been put into production at the Globe Steel Tubes Co.

Froth-Flotation Chemicals

Froth-producing agents for mineral flotation, of improved efficiency, according to R. S. Dean and A. B. Hersberger include the following materials: Betaine hydrochloride cetyl ester, calcium acetyl phosphate, sodium stearyl glycollate, sodium cetyl sulfo-acetate, stearyl tartaric acid and stearyl maleic acid. They give a rich, but not too stable foam at low concentrations and are insensitive to drastic alterations in the hydrogen ion and salt concentrations. They have no collecting action on sulfide or oxide ores, or non-metallic materials. One of the products is being sold under the name of "X-I," but the exact composition of this material is not revealed. *Chemical Trade Journal*, March 20, '36, p. 236.

Leather

Among the recent English patent specifications is listed E. P. 439,833 (1934), on "Waterproofing Leather with Rubber Solutions." The leather, especially chrome leather, is waterproofed by impregnation with rubber solutions containing resinous products obtained by treatment with suitable solvents of rubber, guttapercha or balata. Rubber solution may also contain gums, gum-resins, resins—*e.g.*, gum elemi, dammar, amber or coumarone resins, coloring matter and cold-vulcanizing agents such as precipitated sulfur solution. The leather is preferably degreased before impregnation by a mixture of carbon disulfide and petrol. The product is suitable for pump leathers and machinery belting. *Chemical Trade Journal*, March 20, '36, p. 251.

Artificial Tanning Agents

Satisfactory new tanning materials are being produced by J. R. Geigy, A.-G., Basel, Switzerland (German Patent 611,671), by heating dihydroxydiphenyl sulfone with formaldehyde in the presence of aromatic sulfonic acids, or their formaldehyde—or chlorine-sulfur condensation products in acid solution. Products are immediately obtained which are soluble in water in all proportions; show good tanning properties in weakly acid solution; and yield plump, light-fast leather.

Glucose in Leather Manufacture

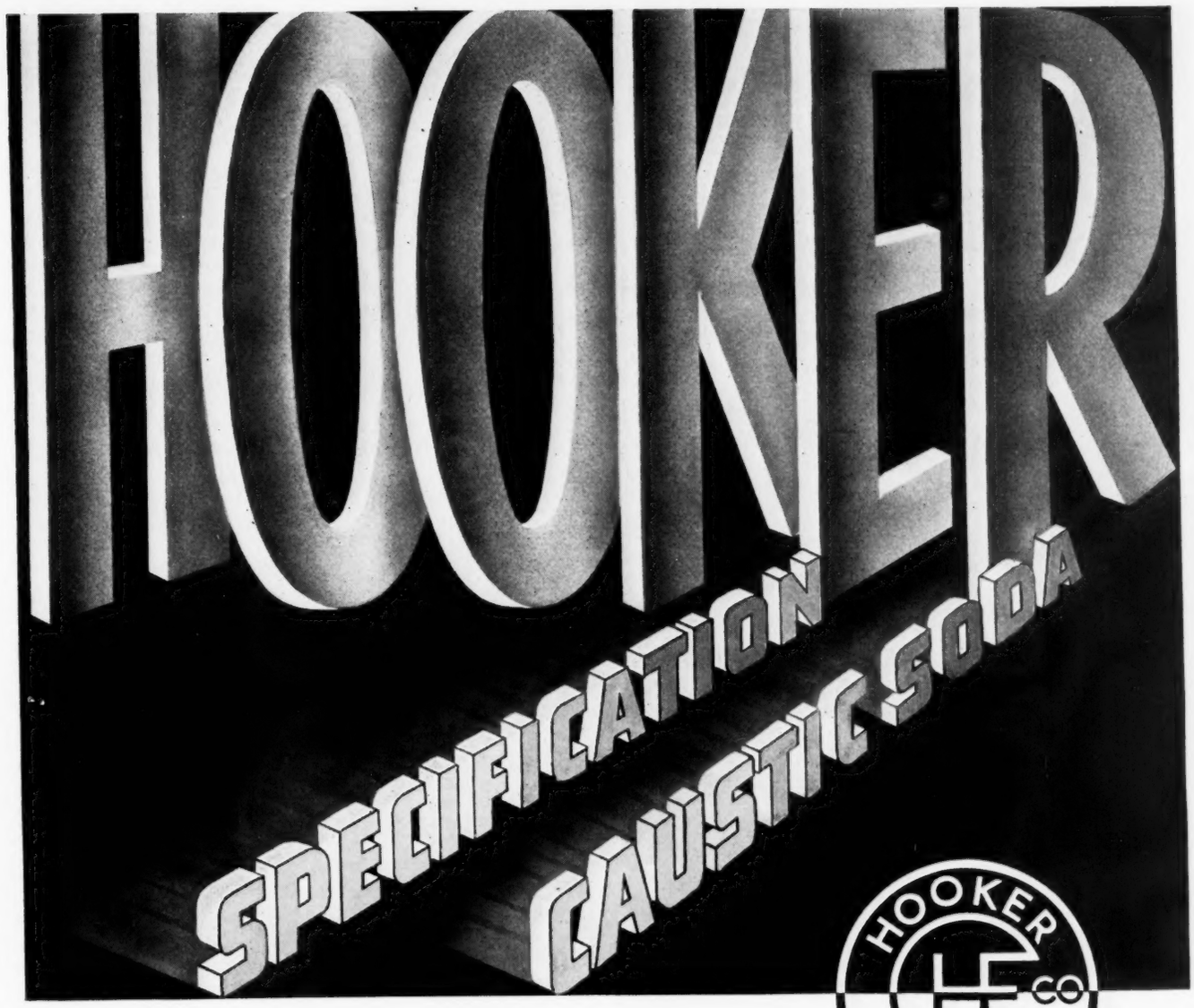
The influence of glucose on the deterioration of chestnut- and quebracho-tanned leathers containing sulfuric acid has been studied by Wallace and Kanagy, U. S. Bureau of Standards. The results show that glucose (5%) has no measurable influence on the deteriorating effect of the acid.

Sanitized Leather

Sanitized leather, said to be actively antiseptic and odorless, will be made by Leather Technologist Frederic L. Hilbert and Herbert W. Topp, glove leather specialist at the Hilbert-Topp Tanning Corp., Johnstown, N. Y. Leather journals call the product revolutionary.

Oils

Babassu nuts, which grow in fabulous quantities in tropical forests of the State of Maranhao, Brazil, are likely to become serious competitors of copra as a source of vegetable oil, according to Colin Thompson, traffic manager, McCormick Steamship Co., Buenos Aires. Any plant that presses copra can handle the babassu nuts with only a few adjustments of machinery. The nuts yield about 70% oil which can be used in the manufacture of soap, margarine and other products in which coconut oil is used.



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Camphor Oil in Synthetic Dyestuffs

Camphor oil as a raw material for synthetic dyestuffs has proved successful in tests made in Formosa. The safrol obtained from the oil can be converted into aminodyhydro safrol which on diazotization yields brown, orange and red azo dyes. *Chemical Age*, Mar. 7, '36, p222.

Drying Qualities of Soybean Oil

Soybean oil is not ideal for paint use because of poor drying qualities, but does possess the excellent characteristics of permanent elasticity and freedom from discoloration. At present, it is seldom used alone; being either blended with oils of better drying qualities or used as a constituent of a synthetic resin vehicle. Its use in paints and varnishes will progress through pressure of popular opinion and as a result of agricultural and industrial research in the improvement of the product. Abstract of a paper on "Soybean Oil and the Paint Industry," by E. E. Ware, delivered before the April meeting of the A.C.S. at Kansas City.

Glass

A high test laminated safety glass, which after being cracked will stretch and bend upon further impact, is announced by Pittsburgh Plate Glass. The secret lies in the development of Vinal, a new plastic with rubber-like stretching qualities and extremely high tensile strength. It is said to be about 10 times as resistant to breakage as other safety glasses at 10 degrees below zero and five times as resistant at 70° F. New product represents a joint effort by Carbide and Carbon's research department at Mellon Institute and Pittsburgh Plate's Duplate research laboratory at Creighton, Pa.

New Batch Material

Nepheline syenite, a highly aluminous rock, will soon be available to U. S. glass manufacturers as a new batch material. Canadian Nepheline, Ltd., who announce this product, state that due to its high alumina and low iron content, its use as a source of alumina in many types of glass seems promising. *Glass Industry*, Mar. '36, p80.

Organic Substitutes for Glass

Possible substitutes for glass among organic materials of the synthetic resin group were referred to in a joint paper read before the Society of Glass Technology in London by Prof. G. T. Morgan, N. J. L. Megson and E. Leighton Holmes. *Chemical Age*, Jan. 18, '36, p. 47.

Miscellaneous

"Z.A.," a new chemical produced by Whiffen and Sons, Ltd., is used for the preparation of solutions for the coating of paper to be used for diazo-type prints. Product is paradiazo-diphenylamine sulfate and is a yellow, light-sensitive substance packed in jars in the form of a paste. The salt is applied to the paper at a concentration of 2% together with ½% tartaric acid and a small quantity of gelatin. Various developers can be used giving prints of different colors. Prints produced by this process are stable to light without having to use a fixing bath or of washing.

Lighter Weight, Acid Resisting Plastic Material

77 SB Black (Durez) is for molded parts in which the unusual combination of qualities—acid resistance, frictional wear resistance and low water absorption—are required. General Plastics, producer, states it can be machined, sanded and buffed after molding, without exposing spots of filler or impairing the above mentioned qualities.

Invert Sugar as Plasticizing Agent

Invert sugar as a plasticizing agent in place of glycerine is attracting the attention of manufacturers of transparent cellulose wrappings of the glassine type, also makers of waxed wrapping papers. Its use is said to have given excellent results. *Chem. Trade Journal* (London), Feb. 21, '36, p158.

Sound Deadening Agent

Spraytex, for dampening vibrations of metal and similar materials which produce noise, is a fluid vehicle supporting a large number of cellular granules. When applied and dried it becomes a homogeneous mass of air cells surrounded by a pliable film of asphaltic binder containing sufficient plasticizers to insure its continued plasticity with age. Emulsified rubber cement is used in its composition. Monroe Equipment Co., Monroe, Mich., producer, claims many advantages over paper board and felt applications.

Caustic Soda from Sodium Sulfate Solutions

Caustic soda from sodium sulfate solutions is referred to in a method suggested by Tanemura and Miyoshi, and depends upon the use of oxalic acid. Process is said to be particularly suitable for the treatment of spent spinning baths from the viscose rayon industry. *Chem. Trade Journal* (London), Feb. 21, '36, p156.

Sodium Sulfite to Remove Sulfur Bloom in Rubber

Modern rubber compounding practice in general utilizes sulfur in such small quantities that, as a rule, sulfur bloom is not frequently encountered. In the past, when it was desired to remove sulfur bloom, goods were boiled in caustic soda or potash, or soda ash. These are strong chemicals that are likely to produce bad ageing effects. Sodium sulfite, which is now being used in a number of laboratories for the determination of free sulfur in rubber goods, may be used commercially for removing sulfur bloom to better advantage than the caustic chemicals which have been used hitherto. From the R. R. Olin Laboratories, Akron, Ohio.

Waste Bleaching Earths for Cements

Waste bleaching earths, when mixed with Portland cement, form excellent building materials. Concrete prepared with this ingredient is highly water-repellent and suffers no loss in strength. Waste bleaching earths reduce the shrinking tendency of plaster and mortar and are excellent fillers for bitumen insulating masses and sheets. Bitumenized wood shavings in conjunction with used bleaching earths and Portland cement yield a satisfactory reinforced flooring and sheeting material. *Chemiker Zeitung*, Feb. 19, '36.

Miscellaneous Booklets

The Chemical Rubber Co., W. 112th st. & Locust ave., Cleveland. Pamphlet announcement of the 20th Edition, *Handbook of Chemistry & Physics*, showing the new and revised material appearing in this most recent edition. Naming of organic compounds has received special attention.

Dept. of Commerce, Bureau of Foreign & Domestic Commerce. "The Suit at Law in Latin America," by H. P. Crawford, Chief of Latin American Legal Section, Division of Commercial Laws. A valuable summary, 52 pages, describing court system of Argentina, including types of civil actions and proceedings. 5c.

Dept. of Interior, Bureau of Mines, Washington, D. C. "A Microcolorimetric Method for the Determination of Benzene," by H. H. Schrenk, S. J. Pearce, and W. P. Yant. R. I. 3287.

Dept. of the Interior, Bureau of Mines. "Petroleum Refineries, Including Cracking Plants in the U. S., January 1, 1935," by G. R. Hopkins and E. W. Cochrane. I. C. 6850.

Dept. of the Interior, Bureau of Mines. "Benzene in Natural Gas," by H. H. Schrenk, W. P. Yant, and S. J. Pearce. A colorimetric determination of low benzene content based on direct nitration of either liquid or gas phase benzene. R. I. 3293.

Dept. of Interior, Bureau of Mines. "Mining & Milling Tungsten Ores," by William O. Vanderburg. I. C. 6852.

U. S. Geological Survey and Georgia Division of Geology, c/o State Geologist, 425 State Capital, Atlanta. A survey of Georgia kyanite reserves has just been published.

University of Chicago, School of Business Administration, Chicago, Ill. "The National Labor Relations Act," by William H. Spencer, Dean of School of Business. Scope, purpose, and the many varied implications are brought clearly to the fore in this startling study of today's most controversial legislation. $1.00.

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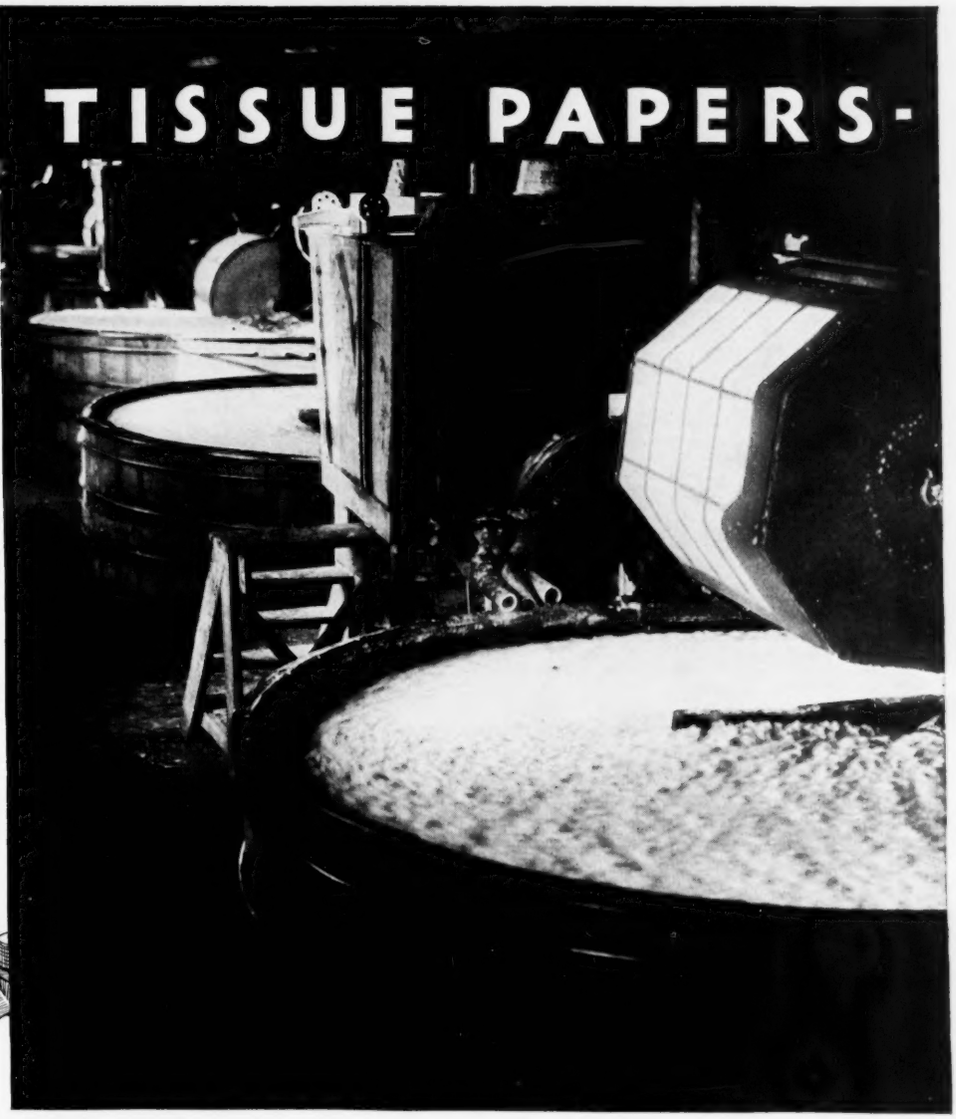

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Agricultural Chemicals

Production tetraphosphate by reacting phosphoric pentoxide with alkali metal hydroxide. No. 2,031,827. Augustus H. Fiske, Warren, and Charles S. Bryan, Providence, R. I., to Rumford Chemical Works, Rumford, R. I.

Production aminoguanidine by reducing nitroguanidine with hydrogen in presence metal catalyst. No. 2,033,203. Russell McGill to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production ammonium phosphate by reacting gaseous ammonia with solution of phosphoric acid in ammonium phosphate. No. 2,033,388. Joe E. Moose, Anniston, Ala., to Swann Research, Inc., a corp. of Ala.

Production diammonium phosphate by reacting ammonia gas with solution of phosphoric acid in ammonium phosphate. No. 2,033,389. Joe E. Moose, Anniston, Ala., to Swann Research, Inc., a corp. of Ala.

Production thiotetraphosphates. No. 2,033,913. Augustus H. Fiske, Warren, and Charles S. Bryan, Providence, R. I., to Rumford Chemical Works, Rumford, R. I.

Production liquid organo derivatives of phosphoric acid. No. 2,033,918. Edgar C. Britton to The Dow Chemical Co., both of Midland, Mich.

Cellulose

Production organic cellulose derivatives by reacting trihydroxy alcohol with aliphatic alcohol to form condensation products. No. 2,031,594. Henry Dreyfus, London, England.

Process of acetylating cellulose using acetic anhydride, acetic acid, and sulfuric. No. 2,031,611. Carl J. Malm and Charles L. Fletcher to Eastman Kodak Co., all of Rochester, N. Y.

Process immunizing cellulosic fibers by esterifying in presence of a sulfonic acid. No. 2,031,657. John Edward Jones, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.

Method of treating solid cellulose derivatives. No. 2,032,549. Richard Muller and Martin Schenck, Berlin-Schoneberg, Mannheim, and Wilhelm Wirbatz, Mannheim-Waldhof, Germany, to C. F. Boehringer & Soehne G.m.b.H., Mannheim-Waldhof, Germany.

Esterification of cellulose by heating in bath containing an organic acid, and organic acid chloride, and pyridine. No. 2,032,748. Joseph F. Haskins, Kenmore, N. Y., to Du Pont Rayon Co., N. Y. City.

Esterification of cellulose which includes addition of phosgene to fatty acid and pyridine during the process. No. 2,032,749. Joseph F. Haskins to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production hydroxy-ethers of cellulose. No. 2,033,126. Henry Dreyfus, London, England.

Alkaline liquor treatment of cellulose ester fabrics using amino-acetic acid or salt in bath. No. 2,033,219. Max Zabel, Dessau in Anhalt, Germany, to General Aniline Works, Inc., N. Y. City.

Production organic acid ester of cellulose. No. 2,033,716. William O. Kenyon and George P. Waugh to Eastman Kodak Co., all of Rochester, N. Y.

Reduction of solution viscosity of cellulose by treatment with mineral acid. No. 2,033,782. William D. Nicoll to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Alkaline wetting and penetrating media for cellulose treatment. No. 2,033,819. Frederick Baxter Downing, Carneys Point, N. J., and Richard Gesse Clarkson, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production hydroxy-alkyl fatty acid esters of cellulose. No. 2,033,820. Henry Dreyfus, London, England.

Process impregnating cellulosic fibre with water-gas-tar pitch. No. 2,033,885. Ira H. Derby to Peter C. Reilly, both of Indianapolis, Ind.

Production cellulosic ester binding composition. No. 2,034,297. Max Heyse and Hans Persiel, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.

Coal Tar Chemicals

Production water soluble diazoamino compounds. No. 2,031,634. Miles Augustinus Dahlen to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production 5-halogen-2-amino-toluenes. No. 2,031,666. Robert L. Perkins, East Aurora, N. Y., to National Aniline & Chemical Co., Inc., N. Y. City.

Production stable solid diazo-salts. No. 2,032,110. Gerald Bonhote to Society of Chemical Industry in Basle, both of Basel, Switzerland.

Production amino-hydroxy-naphthonitriles. No. 2,032,465. William Bradley, Manchester, and Robert Robinson, Oxford, England, to Imperial Chemical Industries, Ltd., a corp. of Great Britain.

Production chrysenemonosulfonic acid. No. 2,032,505. Albert Schmelzer, Cologne-Mulheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production chloro-benzoyl-amino-anthraquinones. No. 2,032,519. Alexander J. Wuertz, Carrollville, and Myron S. Whelen, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production chloro substituted dibenzoylamino anthrimide compounds. No. 2,032,520. Alexander J. Wuertz, Carrollville, and Myron S. Whelen, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production compounds of the anthrapyrimidine series. No. 2,032,539. Max Albert Kunz, Mannheim, and Karl Koeberle and Otto Schlichting, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production hydroxy compounds of the anthrapyrimidine series. No. 2,032,772. Otto Schlichting and Karl Koeberle, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production anthraquinone compounds. No. 2,033,339. David X. Klein, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production compositions from coal tar and higher fatty acid chlorides. No. 2,033,545. Anderson W. Ralston, Carl W. Christensen, and Stewart T. Bauer to Armour & Co., all of Chicago.

Production liquid coal tar distillates by the Friedel-Crafts reaction. No. 2,033,547. Anderson W. Ralston to Armour & Co., both of Chicago.

Production esters of phenylcarbamic acid. No. 2,033,740. Theodore H. Rider, Cincinnati, Ohio.

Production benzanthrones. No. 2,034,485. Ferdinand W. Peck, Pennsgrove, N. J., and John H. Sachs, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production brominated methylbenzanthrones. No. 2,034,629. Wilhelm Moser, Riehen, and Walter Fioroni, Binningen, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Coatings

Method of lacquer compositioning, using paper-like web treated with plasticizer. No. 2,031,606. Edward F. Johnston, Wilmington, Del.

Textile material coated with water-repellant plastic which contains plasticizer of organic phosphate or phthalate. No. 2,031,629. Stuart A. Atkins, Westfield, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method protecting surface of leather or fabric from injury during manufacture or handling, using benzyl cellulose and a plasticizing agent. No. 2,031,673. Robert Schneider, Paris, and Armand Poelman, Charenton, France, to Materials Protector Corp., Newark, N. J.

Production cementitious paint and plastic composition. No. 2,032,071. Herman A. Scholz, Oak Park, Ill., to U. S. Gypsum Co., Chicago.

Production gold-like vitreous enamel surface on a copper-surface base. No. 2,032,236. Karl Turk to The Porcelain Enamel & Mfg. Co. of Baltimore, both of Baltimore, Md.

Auto-oxidation and polymerization catalyst in form of quick drying coating composition. No. 2,032,554. Franciscus Visser't Hooft to Lucidol Corp., both of Buffalo, N. Y.

Production coating composition by reacting tung oil material with an acid organic compound. No. 2,033,131. Carleton Ellis, Montclair, N. J., to Ellis-Foster Co., a corp. of N. J.

Production varnish bases by reacting cashew liquid and an unsaturated acid. No. 2,033,133. Carleton Ellis, Montclair, N. J., to Ellis-Foster Co., a corp. of N. J.

Production coated fabrics using cellulose derivatives and a pigment. No. 2,033,170. Cornelius A. Alt, Edgar H. Nollau, and Donald A. Rankin, Newburgh, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production synthetic resin varnish compositions. No. 2,033,280. Charles L. Gabriel, Lawrence, N. Y., to Resinox Corp., N. Y. City.

Production synthetic resin varnish compositions. No. 2,033,281. Charles L. Gabriel, Lawrence, N. Y., to Resinox Corp., N. Y. City.

Production hard, tough, flexible, adherent, moisture-proof films comprising dissolved vinyl ester resin. No. 2,034,020. Leonard E. Branchen, Rochester, N. Y.; one-half to Carbide & Carbon Chemicals Corp. and one-half to Eastman Kodak Co., both corps. of N. Y.

Production protective composition comprising chlorinated benzene and rubber latex. No. 2,034,656. Ernest R. Hanson, Bloomfield, N. J., to Halowax Corp., N. Y. City.

Dyes, Stains, etc.

Production azo dyes. No. 2,031,651. Emmet F. Hitch and Miles A. Dahlen, Wilmington, Del., and Martin E. Friedrich, Carneys Point, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production acid triphenylmethane dyestuffs. No. 2,032,033. Paul Wolff, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., N. Y. City.

Production monoazo dyes. No. 2,032,093. Henry Jordan and Miles Augustinus Dahlen to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

Production blue dyeing azodyestuffs. No. 2,032,111. Gerald Bonhote, Basel, and Carl Apotheker, Reihen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Production water insoluble disazo dyestuffs. No. 2,032,133. Adolf Krebser to firm J. R. Geigy A. G., both of Basel, Switzerland.

Method dyeing cellulosic fibers with water insoluble azo dyestuffs. No. 2,032,463. Alfred Bergdolt, Ernst Tietze, and Felix Gund, Cologne-am-Rhine, and Anton Ossenbeck, Cologne/Mulheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production polymethine dyes containing a pyrazolone nucleus. No. 2,032,502. Ernest Harry Rodd, Timperley, and Gordon Edward Watts, Brighton, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production water-insoluble azodyestuffs. No. 2,032,627. Friedrich Muth, Leverkusen-I. G. Werk, Germany, to General Aniline Works, Inc., N. Y. City.

Production black sulfur dyestuffs. No. 2,032,635. Paul Schick, Frankfort-am-Main-Fechenheim, and August Bansa, Frankfort-am-Main, Germany, to General Aniline Works, Inc., N. Y. City.

Production stable sulfuric acid esters of vat dyestuffs leuco derivatives. No. 2,033,118. Wilhelm Bauer, Leverkusen-Wiesdorf, Bernhard Bollweg, Leverkusen, and Ludwig Zeh, Leverkusen-Wiesdorf, Germany, to Durand & Huguenin A.-G., Basel, Switzerland.

Production intermediates and dyestuffs of the anthraquinone series. No. 2,033,182. William Dettwyler, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production acid dyestuffs of the anthraquinone series. No. 2.033,316.

Patents digested include issues of the "Patent Gazette," Feb. 25 through Mar. 17, inclusive.

Karl Zahn and Heinrich Koch, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., N. Y. City.

Production complex compounds of ortho-hydroxyazo dyestuffs. No. 2,033,341. Hans Krzikalla, Ludwigshafen-am-Rhine, and Walther Kuehne, Mannheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production vat dyestuffs. No. 2,033,708. Hermann Hauser, Binningen, near Basel, and Max Bommer, Riehen, near Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Production water insoluble azo dyestuffs. No. 2,034,054. Heinrich Morschel, Cologne-Deutz, Germany, to General Aniline Works, Inc., N. Y. City.

Production azo dyestuffs. No. 2,034,247. Hans Reindel, Ludwigshafen-am-Rhine, and Hans Krzikalla, Mannheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production azo dyestuffs. No. 2,034,303. Hans Krzikalla, Ludwigshafen-am-Rhine, and Bernd Eistert, Mannheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production azo dyestuffs. No. 2,034,304. Hans Krzikalla, Ludwigshafen-am-Rhine, and Bernd Eistert, Mannheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production azo dyestuffs containing 8-hydroxyquinaldine as coupling component. No. 2,034,305. Max Albert Kunz, Mannheim, and Hans Krzikalla and Walter Limbacher, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production blue, red, and brown metallized acid azo dyes. No. 2,034,390. Moses Leverock Crossley, Plainfield, and Lincoln Maurice Shafer, Highland Park, N. J., to Calco Chemical Co., Inc., Bound Brook, N. J.

Process obtaining contrasts using diazonium compounds. No. 2,034,508. Jan Hendrik De Boer, Cornelius Johannes Dippel, and Roelof Jan Hendrik Alink, to N. V. Philips' Gloeilampenfabrieken, all of Eindhoven, Netherlands.

Production indigoid dyestuffs. No. 2,034,622. Eduard Kambli, Basel, and Ernst Stocklin, Binningen, near Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Production azo dyestuffs. No. 2,034,668. Hans Reindel, Ludwigshafen-am-Rhine, Hans Krzikalla, Mannheim, and Walter Limbacher, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Explosives

Production smokeless powder from nitrocellulose grains. No. 2,031,659. Milton F. Lindsley, Jr., Kings Mills, Ohio, to E. I. du Pont de Nemours & Co., Wilmington, Del.

Blasting cap composition comprising nitrocellulose impregnated with liquid explosive nitric ester. No. 2,031,677. Charles P. Spaeth, Woodbury, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Purification of trinitrotoluene by treating with dichlorbenzene and carbon tetrachloride. No. 2,032,035. Joseph A. Wyler, Allentown, Pa., to Trojan Powder Co., a corp. of N. Y.

Production pulverulent dynamite composition comprising pentaerythrite and liquid nitrated organic compound. No. 2,033,196. Norman G. Johnson and Harold A. Lewis, Woodbury, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production explosive comprising liquid nitric ester and an aromatic nitro compound. No. 2,033,198. William E. Kirst, Woodbury, N. J., and Clifford A. Woodbury, Media, Pa., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production nitrocellulose smokeless powder. No. 2,033,217. Richard G. Woodbridge to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Fine Chemicals

Production propionic acid esters. No. 2,031,603. Harold S. Holt to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Method dehydrating wet organic acid esters. No. 2,031,669. Gustave T. Reich, Drexel Hill, Pa.

Production disulfides from mercaptothiazoles. No. 2,031,714. Gerhard Kallner to Silesia Verein Chemischer Fabriken, both of Ida- und Marienhutte, near Saarau, Germany.

Production carboxylic acid derivatives of sulfurized cinchona bark alkaloids for use as corrosion inhibitors. No. 2,031,895. Ralph E. Lawrence, Wickliffe, Ohio, to The Grasselli Chemical Co., Cleveland.

Production highly branched, long chain organic acids. No. 2,032,159. Frank C. Whitmore, State College, Pa., August H. Homeyer, St. Louis, Mo., David M. Jones, Forty Fort, Pa., and Walter R. Trent, State College, Pa., to Mallinckrodt Chemical Works, St. Louis, Mo.

Production carbohydrate sugar. No. 2,032,160. John M. Widmer, Cedar Rapids, Iowa, to Penick & Ford, Ltd., Inc., N. Y. City.

Production esters of sulfonated carboxylic acids. No. 2,032,313. Heinrich Bertsch to H. Th. Bohme Akteingesellschaft, both of Chemnitz, Germany.

Production esters of sulfonated carboxylic acids. No. 2,032,314. Heinrich Bertsch to firm H. Th. Bohme Akteingesellschaft, both of Chemnitz, Germany.

Method and apparatus from purifying mercury. No. 2,032,601. Walter V. Stearns to Sun Oil Co., both of Philadelphia.

Mercury purification process. No. 2,032,602. Walter V. Stearns to Sun Oil Co., both of Philadelphia.

Production succinic acid esters of 2-ethyl-hexanol-1. No. 2,032,679. Jacob N. Wickert, Charleston, W. Va., to Carbide & Carbon Chemicals Corp., a corp. of N. Y.

Production bismuth salt of a campholic acid. No. 2,032,994. Louis Lecoq, Levallois, France.

Synthesis of aliphatic monocarboxylic acids by catalytic addition of carbon monoxide and water to olefinic hydrocarbons. No. 2,033,161. Walter E. Vail, Charleston, W. Va., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Hydrogenation of furfuranes using catalyst of the iron group. No. 2,033,292. Wilbur A. Lazier, Marshallton, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Separation of isomeric chloro-methyl-anthraquinones. No. 2,033,363. John M. Tinker, South Milwaukee, and Viktor M. Weinmayr, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Nitration of diphenyl by treating mixture of molten diphenyl and an alkali metal nitrate with sulfuric acid. No. 2,033,370. John L. Ballard and Russell L. Jenkins, Anniston, Ala., to Swann Research, Inc., a corp. of Ala.

Production nicotine alumino-penta-silicate. No. 2,033,495. Charles C. Taylor and Arthur L. Galloway to Tobacco By-Products & Chemical Corp., all of Louisville, Ky.

Production cinchona alkaloid derivative. No. 2,033,514. Leonard H. Cretcher, William L. Nelson, Courtland L. Butler, and Alice G. Renfrew, Pittsburgh, Pa., to Mellon Institute of Industrial Research, a corp. of Pa.

Production apocupreine and its derivatives. No. 2,033,515. Leonard H. Cretcher, Courtland L. Butler, and Alice G. Renfrew, Pittsburgh, Pa., to Mellon Institute of Industrial Research, a corp. of Pa.

Production hydroxylated carboxylic acids. No. 2,033,538. Anderson W. Ralston and Stewart T. Bauer to Armour & Co., all of Chicago.

Production mixed phenoxyphenyl-alkyl ketones. No. 2,033,540. Anderson W. Ralston and Carl W. Christensen to Armour & Co., all of Chicago.

Production mixed diphenyl-alkyl ketones. No. 2,033,541. Anderson W. Ralston and Carl W. Christensen to Armour & Co., all of Chicago.

Production mixed furyl-alkyl ketones. No. 2,033,542. Anderson W. Ralston and Carl W. Christensen to Armour & Co., all of Chicago.

Production mixed furyl-alkyl ketones. No. 2,033,548. Anderson W. Ralston and Carl W. Christensen to Armour & Co., all of Chicago.

Purification of apocupreine. No. 2,033,555. Benjamin L. Souther, Allison Park, Courtland L. Butler and Leonard H. Cretcher, Pittsburgh, Pa., to Mellon Institute of Industrial Research, a corp. of Pa.

Production hydroxyethylapoquinine. No. 2,033,679. Courtland L. Butler and Leonard H. Cretcher, Pittsburgh, Pa., to Mellon Institute of Industrial Research, a corp. of Pa.

Production aliphatic or cycloaliphatic primary amines. No. 2,033,866. Walther Schrauth, Berlin-Dahlem, Germany, to "Unichem" Chemikalien Handels A. G., Zurich, Switzerland.

Glass and Ceramics

Preparation concrete by mixing hydraulic cement and water in presence hydroxy-alkyl amine. No. 2,031,621. George R. Tucker, deceased, late of North Andover, Mass., by Charles W. Tucker, North Andover, administrator, and Henry L. Kennedy, Arlington, and Maynard S. Renner, Cambridge, Mass., to Dewey & Almy Chemical Co., North Cambridge, Mass.

Production glass permeable to ultraviolet rays comprising mainly barium metaphosphate and metaphosphate of one alkaline earth metal. No. 2,031,958. Waldemar Kaufmann and Everhard Bungartz to I. G., all of Frankfort-am-Main, Germany.

Method removing iron and other impurities from glass sand. No. 2,031,969. Rob R. McGregor, Swissvale, and Edwin W. Tillotson, Pittsburgh, Pa., to Macbeth-Evans Glass Co., Charleroi, Pa.

Production vitreous material by reducing boric acid and alkali carbonates to fine powders and heating to produce a frit. No. 2,032,239. Albert William Henry Wedlock, Leyton, London, England.

Preparation of Portland cement raw mixtures. No. 2,032,346. Louis A. Dahl and Wilson C. Hanna, Colton, Cal., to California Portland Cement Co., Los Angeles, Cal.

Production Portland cement. No. 2,032,347. Louis A. Dahl and Wilson C. Hanna, Colton, Cal., to California Portland Cement Co., Los Angeles, Cal.

Production laminated glass using central layer of Celluloid and outer layers of esters of acrylic and methacrylic acids. No. 2,032,663. Harry Trainor Neher, Bristol, Pa., to Rohm & Haas Co., Philadelphia.

Process for glazing lead-containing glass, enamels, glazes, etc. No. 2,033,103. Paul Beyersdorfer, Reichenbach, Germany.

Production laminated glass using adhesive intermediate layer. No. 2,033,377. Willy O. Herrmann and Erich Baum to Chemische Forschungsgesellschaft m. b. H., all of Munich, Germany.

Use of a deliquescent chloride in treatment of vitried ceramic grinding wheel. No. 2,033,668. Nils Gunnar Anderson and Axel Fredrik Thure Lofquist, Malmo, Sweden, to Norton Co., Worcester, Mass.

Production vitreous enamel white opacifying agent. No. 2,033,707. William J. Harshaw, Shaker Heights, and William D. Stillwell, Cleveland, Ohio, to The Harshaw Chemical Co., Elyria, Ohio.

Production refractory comprising olivine, chrome ore, and calcined magnesite. No. 2,033,886. Walter M. Farnsworth, Canton, Ohio, to The Republic Steel Corp., Youngstown, Ohio.

Production heat-resistant discrete fibers. No. 2,033,923. Simon Collier, Waukegan, Ill., to Johns-Manville Corp., N. Y. City.

Production friction element comprising asbestos impregnated with dried inorganic compound. No. 2,033,928. James Driscoll, Plainfield, and Donald S. Bruce, Somerville, N. J., to Johns-Manville Corp., N. Y. City.

Production friction element. No. 2,033,929. James Driscoll, Plainfield, and Donald S. Bruce, Somerville, N. J., to Johns-Manville Corp., N. Y. City.

Production dry mixture of clay, alum and lime. No. 2,034,519. Leon H. Larson, Norwalk, Conn., to R. T. Vanderbilt Co., Inc., N. Y. City.

Industrial Chemicals, etc.

Production formal diethylene glycol by reacting formaldehyde with diethylene glycol in presence concentrated hydrochloric. No. 2,031,619. George W. Seymour, Cumberland, Md., to Celanese Corp. of America, a corp. of Del.

Process separating acidic gases from mixtures by contacting with aqueous basic organic amino compound. No. 2,031,632. Robert Roger Bottoms to The Girdler Corp., both of Louisville, Ky.

Separation of water from lower aliphatic acids and anhydrides. No. 2,031,637. Henry Dreyfus, London, England.

Recovery of non-sugars from an aqueous saccharine solution by addition of ethyl alcohol and ammonium salt. No. 2,031,670. Gustave T. Reich, Philadelphia.

Production calcium chlorite using chlorine dioxide and a slurry of calcium hydroxide and chlorate. No. 2,031,681. George Paul Vincent, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., N. Y. City.

Production highly emissive cathodes. No. 2,031,721. Siegmund Loewe, Berlin-Steglitz, Germany.

Sulfuric acid contact process using catalyst of platinum deposited on magnesium sulfate-aluminum sulfate-iron sulfate carrier. No. 2,031,787. John H. Perry and Earl S. Ridler, Shaker Heights, Ohio, to The Grasselli Chemical Co., Cleveland.

Pyrites roasting process. No. 2,031,801. Daniel Tyrer, Norton-on-Tees, England, to Imperial Chemical Industries Ltd., London, England.

Regenerative absorption of sulfur dioxide by washing with aqueous mono-basic phosphate and sodium citrate solution. No. 2,031,802. Daniel Tyrer, Norton-on-Tees, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production and purification of caustic soda. No. 2,031,844. Hugh K. Moore to Brown Co., both of Berlin, N. H.

Use of sulfuric acid in decolorizing natural gypsum. No. 2,031,898. Frank Lee Marsh to The Best Bros. Keene's Cement Co., both of Medicine Lodge, Kans.

Use of zinc chloride base flux. No. 2,031,913. Edward A. Taylor, Shaker Heights, Ohio, to The Grasselli Chemical Co., Cleveland.

Production of materials suitable for impregnation of porous articles. No. 2,031,929. Wilhelm Breuers, Ludwigshafen-am-Rhine, Hermann Mark, Mannheim, and Erich Konrad, Leverkusen, Germany, to I. G., Frankfort-am-Main, Germany.

Production stabilized refined mineral, vegetable, and animal oils. No. 2,031,930. Hyym E. Buc, Roselle, N. J., to Standard Oil Development Co., a corp. of Del.

Halogenation of organic fluids by various processes. No. 2,031,938.

Richard M. Deanesly and George Hearne, Berkeley, Cal., to Shell Development Co., San Francisco.

Manufacture of silicon carbide resistors. No. 2,032,077. Almer J. Thompson to Globar Corp., both of Niagara Falls, N. Y.

Production dry water soluble alkali earth metal hypochlorite containing a phosphate solubilizing agent. No. 2,032,173. Arnold H. Johnson and Henning A. Trebler, Baltimore, Md., to Sealtest System Laboratories, Inc., N. Y. City.

Recovery of crystalline salts from solution. No. 2,032,201. Sidney H. Davis, Tulsa, Okla., Carl O. Anderson, Baxter Springs, Kans., and Rudolph J. Stengl, Monahans, Tex., to Ozark Chemical Co., Tulsa, Okla.

Weld rod coating comprising ilmenite, mica, and a binder silicate. No. 2,032,322. Paul R. Judy to Indiana Steel & Wire Co., both of Muncie, Ind.

Production calcined borax. No. 2,032,388. William H. Allen to American Potash & Chemical Corp., both of Trona, Cal.

Process of treating and odorizing combustible gas using organic sulfur compounds and an organic tertiary amino compound. No. 2,032,431. William W. Odell, N. Y. City.

Process dehydrating concentrated sulfuric acid with phosphoric acid. No. 2,032,457. Marshall F. Acken, Woodbury, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method extracting animal oil from crude, water-containing mixtures. No. 2,032,543. Weaver L. Marston, Devon, Pa.

Production bleaching powder by reacting lime hydrate and chlorine gas. No. 2,032,632. Eugen Renschler, Rheinfelden, and Adolf Renele, Sandersdorf, Germany, to I. G., Frankfort-am-Main, Germany.

Process compounding a rock asphalt paving composition. No. 2,032,680. Harry Comer Wolf to Wolf Engineering Co., Inc., both of Indianapolis, Ind.

Production nitric acid from ammonia. No. 2,032,684. Ormond J. Chinnock, Hercules, Cal., to Hercules Powder Co., Wilmington, Del.

Production sodium nitrite by absorption of nitrogen oxides in sodium carbonate solution. No. 2,032,699. John W. Hayes and Harry C. Britton, Syracuse, N. Y., to The Solvay Process Co., N. Y. City.

Purification of thiosulfate-containing calcium chloride brines by use of calcium hydroxide, carbon dioxide and chlorine. No. 2,032,702. Paul A. Keene and Arlie P. Julien, Syracuse, N. Y., to The Solvay Process Co., N. Y. City.

Purification of thiosulfate-containing calcium chloride brines by heating with an inorganic acid. No. 2,032,727. Carl Sundstrom and John W. Hayes, Syracuse, N. Y., to The Solvay Process Co., N. Y. City.

Stabilization of mineral oil compositions using 2, 4 diamino diphenylamine. No. 2,032,787. Thomas W. Bartram, Nitro, W. Va., to Monsanto Chemical Co., Wilmington, Del.

Production anhydrous aluminum chloride by reacting the metal with bromoform, decomposing to activated metal, and reacting with chlorine. No. 2,033,055. Ludwig Valik, Long Island City, N. Y., to Givaudan-Delawanna, Inc., N. Y. City.

Production of organic acids. No. 2,033,056. Joseph Frederic Walker, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production potassium oxalate from potassium formate. No. 2,033,097. Max Enderli and August Schrodt to firm Rudolph Koepp & Co., Chemische Fabrik A. G., all of Oestrich, Germany.

Soldering stick or cake comprising zinc ammonium chloride, tin and lead formed into homogeneous structure. No. 2,033,102. Arthur S. Berry, Jersey City, N. J., to Berry Solder Co., Inc., N. Y. City.

Production heat insulating composition. No. 2,033,106. Arthur B. Cummins, Plainfield, N. J., to Johns-Manville Corp., N. Y. City.

Production ammonium salt of tung oil or tung oil acids. No. 2,033,132. Carleton Ellis, Montclair, N. J., to Ellis-Foster Co., a corp. of N. J.

Precovery of potassium salts from ground, calcined polyhalite. No. 2,033,149. Everett P. Partridge, Park View Estates, N. J., and Nathan Fragen, Ann Arbor, Mich., to U. S. A., by Sec. of Commerce.

Recovery of potassium sulfate from syngenite by decomposition with potassium sulfate liquor. No. 2,033,159. Henry H. Storch, Pittsburgh, Pa., and Nathan Fragen, Ann Arbor, Mich., to the U. S. A., by Sec. of Commerce.

Production alkyl halogen compounds. No. 2,033,374. Frederick H. Gayer to General Motors Corp., both of Detroit.

Production carbureted water gas. No. 2,033,511. Hiram J. Carson, Omaha, Neb.

Production hard cemented carbide material. No. 2,033,513. Gregory J. Comstock, Fairfield, Conn., to Firth-Sterling Steel Co., McKeesport, Pa.

Production nitriles of fatty acids. No. 2,033,536. Anderson W. Ralston, William O. Pool, and James Harwood to Armour & Co., all of Chicago.

Production higher fatty acid nitriles. No. 2,033,537. Anderson W. Ralston, William O. Pool, and James Harwood to Armour & Co., all of Chicago.

Production aldehydes from higher fatty acids. No. 2,033,539. Anderson W. Ralston and Carey B. Jackson to Armour & Co., all of Chicago.

Production dibenzyl chlorine derivatives. No. 2,033,612. Frank M. Clark and Walter M. Kutz, Pittsfield, Mass., to General Electric Co., a corp. of N. Y.

Production aqueous clay emulsion of bitumen. No. 2,033,657. Preston R. Smith, Rahway, N. J., to The Barber Asphalt Co., Philadelphia.

Separation of tertiary butyl alcohol. No. 2,033,684. Gerald H. Coleman and Glenn W. Warren to The Dow Chemical Co., all of Midland, Mich.

Production blanc fixe being particularly soft and lime free. No. 2,033,696. Otto Englert, Wilhelm Becker, and Franz Becker, Prague, Czechoslovakia.

Production heat storage and transfer agent. No. 2,033,702. John J. Grebe and Sylvia M. Stoesser to The Dow Chemical Co., all of Midland, Mich.

Purification of acetic anhydride by treating with cuprous oxide to remove sulfur and halogen. No. 2,033,720. Newton Lamb, Saginaw, Mich., to The Dow Chemical Co., Midland, Mich.

Arc-welding electrode coated with magnesium silicate and water glass. No. 2,033,730. Fritz Muller, Furstenwalde, Germany, to N. V. Machinerieen-en-Apparaten Fabrieken "Meaf," Utrecht, Netherlands.

Production carbohydrate derivatives. No. 2,033,787. George W. Rigby to E. I. du Pont de Nemours & Co., Wilmington, Del.

Hydraulic fluid comprising neutral naphthenic acid salt in organic solvent. No. 2,033,853. Morton Roland Sherbino to The Midland Steel Products Co., both of Cleveland, Ohio.

Production compounds of bentonite with organic bases. No. 2,033,856. Claude R. Smith, Washington, D. C.

Production calcium levulinate by reacting an ester of levulinic acid with calcium hydroxide. No. 2,033,909. Gerald J. Cox and Mary L. Dodds, Pittsburgh, Pa., to Niacet Chemicals Corp., N. Y. City.

Purification of dialkyl sulfates. No. 2,033,910. Henry Leon Cox and Thomas F. Carruthers to Carbide & Carbon Chemicals Corp., all of South Charleston, W. Va.

Production triaryl phosphate. No. 2,033,916. Shailer L. Bass to The Dow Chemical Co., both of Midland, Mich.

Production of a dehumidifying solution. No. 2,033,934. John J. Grebe, Sylvia M. Stoesser, and Forest R. Minger to The Dow Chemical Co., all of Midland, Mich.

Production organic fluorine compounds. No. 2,033,949. Herbert August Lubs and Arthur Lawrence Fox to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

Concentration of lower aliphatic acids. No. 2,033,978. Henry Dreyfus, London, England.

Production catalyst for either hydrogenation or dehydrogenation. No. 2,034,077. Herrick R. Arnold, Elmhurst, and Wilbur A. Lazier, Marshallton, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production light sensitive layer for use as photographic film. No. 2,034,220. Donald K. Allison, Los Angeles, Cal., to Detracolor, Ltd., a corp. of Nev.

Production chromic acid by treating sodium bichromate and chloride with sulfuric acid. No. 2,034,256. Joseph J. Vetter, Hackensack, N. J., to Natural Products Refining Co., Jersey City, N. J.

Production carbon chlorides. No. 2,034,292. John J. Grebe, John H. Reilly, and Ralph M. Wiley to The Dow Chemical Co., all of Midland, Mich.

Concentration of aqueous formic acid. No. 2,034,332. Otto Dragendorff to firm Rudolph Koepp & Co. Chemische Fabrik A. G., both of Oestrich, Germany.

Manufacture of briquettes using semi-emulsion binder of liquid tar, water, and acetic acid. No. 2,034,351. Henry H. Moreton, Santa Monica, Cal.

Production aliphatic amines by reacting anhydrous ammonia with aliphatic halide. No. 2,034,427. Arthur W. Campbell, Stow, Ohio, to The B. F. Goodrich Co., N. Y. City.

Production aryl mercaptans and their derivatives. No. 2,034,459. John Elton Cole to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production fireproof building material comprising asbestos fiber and resinous filler. No. 2,034,522. Emil C. Loetscher, Dubuque, Iowa.

Production of oleum by absorption of sulfur trioxide in sulfuric acid. No. 2,034,554. Josef Bayer, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Production chlorinated diphenyl-sulfur mixtures. No. 2,034,580. Russell L. Jenkins and Glennon Hardy, Anniston, Ala., to Swann Research, Inc., a corp. of Ala.

Method drying inorganic salts and sludges. No. 2,034,599. Dirk J. Van Marle to Buffalo Foundry & Machine Co., both of Buffalo, N. Y.

Production sulfur-containing terpene compounds. No. 2,034,665. Emil Ott, Elsmere, Del., to Hercules Powder Co., Wilmington, Del.

Removal of water from hydrated calcium chloride. No. 2,034,682. Otto V. Martin, Tulsa, Okla., to Texaco Salt Products Co., N. Y. City.

Leather and Tanning

Production leather product treated with a lubricant, an emulsifying agent, glycerin and honey. No. 2,032,250. Bert H. Bower, Gloversville, N. Y.

Process of vulcanizing a rubber composition to a heated leather surface using hot, viscous latex cement. No. 2,032,471. Leon B. Conant, Chicago, Ill.

Production leather substitute made by saturating fibrous sheet with rubber compound solution. No. 2,033,099. Albert J. Hanley, Cranston, and Roland B. Respess, Wickford, R. I., to Respro Inc., Cranston, R. I.

Process depilating and bating hides. No. 2,033,163. Leo Wallerstein, N. Y. City, and Julius Pfannmuller, Stapleton, N. Y., to Wallerstein Co., Inc., N. Y. City.

Production artificial leather base. No. 2,033,486. Milton O. Schur to Brown Co., both of Berlin, N. H.

Metals, Alloys, Ores

Production steel alloy containing small amounts carbon, chromium, molybdenum, vanadium, and nickel. No. 2,031,904. Fritz Ritterhausen and Heinz Korschan, Essen, Germany, to Fried. Krupp Aktiengesellschaft, Essen-am-Ruhr, Germany.

Process of refining carbon-containing alloys. No. 2,031,947. Ture Robert Haglund, Stockholm, Sweden.

Magnesium base alloys comprising tin, cobalt, zinc, and balance magnesium. No. 2,031,978. Roy E. Paine, Cleveland, Ohio, to Magnesium Development Corp., a corp. of Del.

Method of surface hardening metals by imbedding in an abrasive refractory. No. 2,032,694. Samuel E. Gertler; one-half to Harry I. Stein, both of N. Y. City.

Heat treatment for hardening steel using bath of solid barium, potassium and sodium chlorides. No. 2,032,700. Frederick Jarvis, Philadelphia.

Method of refining lead. No. 2,032,788. Jesse O. Betterton and Yurii E. Lebedeff, Metuchen, N. J., to American Smelting & Refining Co., N. Y. City.

Method of coating metallic aluminum surface by immersing in hot dilute hydrofluoric acid solution saturated with aluminum fluoride. No. 2,032,897. Robert R. Tanner to Metal Finishing Research Corp., both of Detroit, Mich.

Surface hardening of metals by cementation with antimony. No. 2,032,912. Micheal George Corson, Woodside, N. Y., to General Electric Co., a corp. of N. Y.

Method of coloring and hardening steel. No. 2,032,963. Henry J. N. Voltmann, Brooklyn, N. Y., to W. S. Rockwell Co., N. Y. City.

Production alloys containing boron. No. 2,033,172. Jean Lucien Andrieux, Grenoble, France, to Societe d'Electrochimie d'Electrometallurgie et des Acieries Electriques d'Ugine, Paris, France.

Process of powder metallurgy. No. 2,033,240. Charles Hardy, Pelham Manor, N. Y., to Hardy Metallurgical Co., a corp. of Del.

Method of etching aluminum by amalgamating and then treating with alcoholic nitrobenzene mixture. No. 2,033,444. Yusiti Nisizawa, Tokyo, Japan.

Production copper alloys containing silver and chromium. No. 2,033,709. Franz R. Hensel, Indianapolis, Ind., and Earl I. Larsen, Newark, N. J., to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Production copper alloys containing chromium and cadmium. No. 2,033,710. Franz R. Hensel, Indianapolis, Ind., and Earl I. Larsen, Newark, N. J., to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Steel die block alloy containing carbon, aluminum, chromium, nickel, molybdenum, and having a nitride-hardened working surface. No. 2,033,915. Pierre Francois Marie Aubert, Paris, France, to The Nitralloy Corp., a corp. of Del.

Production alloy containing titanium, carbon, graphite, silicon, aluminum, and iron. No. 2,033,974. George F. Comstock, Niagara Falls, N. Y., to The Titanium Alloy Mfg. Co., N. Y. City.

Production low carbon steel containing copper and silicon. No. 2,034,-

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136. Alexander Finlayson to Pacific Car & Foundry Co., both of Seattle, Wash.

Electrolytic method for aluminum refining. No. 2,034,339. Robert Andre Gadeau, St.-Jean-de-Maurienne, France, to Compagnie de Produits Chimiques et Electro-Metallurgiques Alais, Froges et Camargue, Paris, France.

Process removing zinc impurities from aluminum. No. 2,034,372. Jesse O. Betterton and Albert J. Phillips, Metuchen, N. J., to American Smelting and Refining Co., N. Y. City.

Use of ferrous sulfate in pack rolling ferrous metals. No. 2,034,425. Terrence W. Allsworth to The American Rolling Mill Co., both of Middletown, Ohio.

Copper alloy containing small amount of cadmium. No. 2,034,561. Charles H. Davis, Cheshire, Conn., to The American Brass Co., Waterbury, Conn.

Production alloy containing copper, cadmium, nickel, and aluminum. No. 2,034,562. Charles H. Davis, Cheshire, and Elmer L. Munson, Naugatuck, Conn., to The American Brass Co., Waterbury, Conn.

Production alloy of copper, cadmium and silicon. No. 2,034,563. Charles H. Davis, Cheshire, Elmer L. Munson, Naugatuck, and Cyril Stanley Smith, Cheshire, Conn., to The American Brass Co., Waterbury, Conn.

Naval Stores

Impregnating wood with Montan wax after preliminary treatment with dilute aqueous hydrochloric acid. No. 2,031,973. Charles W. Mudge, Cranford, N. J., to Standard Oil Development Co., a corp. of Del.

Process separating "B" wood resin. No. 2,033,947. William Burns Logan, Lake Charles, La., and Ismond E. Knapp, Pensacola, Fla., to Newport Industries, Inc., Pensacola, Fla.

Paper and Pulp

Surface-finished paper and finish used therewith. No. 2,031,854. George A. Richter to Brown Co., both of Berlin, N. H.

Recovery of pulping chemicals from waste pulping liquors. No. 2,031,974. Harold R. Murdock to The Champion Fibre Co., both of Canton, N. C.

Production bank note safety paper. No. 2,032,385. Frank S. Wood, Newton, Mass., to Frank W. Wood, Astoria, N. Y.

Process of pulping raw cellulosic material using ammonia fumes, sulfur dioxide and water. No. 2,032,437. George A. Richter to Brown Co., both of Berlin, N. H.

Production wood pulp for paper manufacture. No. 2,032,615. Clark T. Henderson, Burlingame, Cal.

Method decreasing the normal absorbency loss in unsized absorbent paper. No. 2,032,645. Merrill A. Youtz to Northern Paper Mills, both of Green Bay, Wis.

Sizing and impregnating cellulosic material in paper production. No. 2,033,351. Harry Huet Nelson, Paris, and Guillaume Becker, Asnieres, France.

Production artificial lumber by chemical treatment of redwood sawdust. No. 2,033,411. Francis L. Carson to The Pacific Lumber Co., both of San Francisco.

Chemical stabilization of paper. No. 2,033,452. Otto J. Schierholtz, to Ontario Research Foundation, both of Toronto, Ontario, Canada.

Production paper of high porosity and wet strength containing a cellulose hydroxy ether. No. 2,033,481. George A. Richter to Brown Co., both of Berlin, N. H.

Production porous, absorptive, flexible water-laid felt. No. 2,033,485. Milton O. Schur and Walter L. Hearn to Brown Co., all of Berlin, N. H.

Production filled paper using calcium carbonate magnesium basic carbonate. No. 2,033,954. Harold Robert Rafton, Andover, Mass., to Raffold Process Corp., a corp. of Mass.

Production coated paper using a base pigment, lime, water, alum, alkali and adhesive. No. 2,034,435. Clark C. Heritage, Rumford, Me., to Oxford Paper Co., a corp. of Me.

Petroleum Chemicals

Inhibiting gum formation in naphthas, using aromatic amino and phenolic compounds. No. 2,031,917. Carl Winning, Leonard E. Sargent, and James F. Dudley, Elizabeth, N. J., to Standard Oil Development Co., a corp. of Del.

Process sweetening mineral oil distillate by treatment with alkali hydroxide and elementary sulfur. No. 2,031,972. Franz Rudolf Moser, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Cal.

Fuel for internal combustion engines containing about one per-cent monocyclic ketone. No. 2,032,242. Samuel Whyte, Redhill, England.

Use of chromium oleate as anti-sludging agent in lubricating oils. No. 2,032,279. Alan Arnold Griffith and William Helmore, South Farnborough, England, to C. C. Wakefield & Co., Ltd., London, England.

Compound for petroleum treatment comprising mixture of shale sludge, extract of tobacco, petroleum distillate, emulsifying agent, soap and soap solvent. No. 2,032,527. James E. Cox, Oakland, Cal., to D. M. Dorman, Los Angeles.

Removal of sulfur from cracked gasolines using sulfuric acid. No. 2,032,662. John M. McGee and Robert M. Roe, Caspar, Wyo., to Standard Oil Co. (Indiana), Chicago.

Method of retarding water flow in oil wells using a water insoluble plastic substance. No. 2,032,825. Henry A. Ambrose, Pittsburgh, Pa., to Gulf Research & Development Corp., Wilmington, Del.

Method of selectively shutting off water flow in oil wells using water insoluble, oil soluble plastic substance. No. 2,032,826. Henry A. Ambrose and Abraham J. Teplits, Pittsburgh, Pa., to Gulf Research & Development Corp., Wilmington, Del.

Removal of carbonaceous impurities from hydrogen and other gases. No. 2,032,925. John S. Ferguson, Schenectady, N. Y., to General Electric Co., a corp. of N. Y.

Method of removing wax haze from various type oils. No. 2,033,057. Rhea N. Watts and John McA. Harris, Jr., Baton Rouge, La., to Standard-I. G. Co.

Use of aqueous heavy metal salt solution in refining of hydrocarbon oils. No. 19,879—reissue. Arthur Lachmann, Berkeley, Cal., to Vapor Treating Processes, Inc., a corp. of Cal.

Production barium grease. No. 2,033,148. Thomas F. Ott, Berkeley, and Philip S. Clarke and Claude H. Van Marter, Richmond, Cal., to Union Oil Co. of Cal., Los Angeles.

Purification and stabilization of light aromatic oils. No. 2,033,297. Alfred Pott, Hans Broche, and Kuno Ehrmann, Essen, Ruhr, Germany.

Production ketone-containing lubricating oil. No. 2,033,543. Anderson W. Ralston and Carl W. Christensen to Armour & Co., all of Chicago.

Production lubricating oils by the Friedel-Crafts reaction. No. 2,033,546. Anderson W. Ralston, Carl W. Christensen, and William M. Selby to Armour & Co., all of Chicago.

Production of catalyst for crude petroleum treatment. No. 2,033,737. William B. Plummer to Standard Oil Co. (Indiana), both of Chicago.

Process inhibiting gum formation in motor fuels. No. 2,033,877. Robert E. Burk to The Standard Oil Co., both of Cleveland, Ohio.

Treatment of hydrocarbon oil with unsaturated aliphatic alcohol. No. 2,033,932. Seymour W. Ferris, Aldan, Pa., to The Atlantic Refining Co., Philadelphia.

Use of aliphatic sulfone in hydrocarbon oil treatment. No. 2,033,942. Stewart S. Kurtz, Jr., Merion, Pa., to The Atlantic Refining Co., Philadelphia.

Production improved motor fuel containing an acyl derivative of a polyhydric phenol. No. 2,034,024. Louis A. Clarke, Fishkill, N. Y., to The Texas Co., N. Y. City.

Use of active free sodium in hydrocarbon oil refining. No. 2,034,068. Justin F. Wait, N. Y. City.

Treatment of hydrocarbon oils using alkali metal hydroxide and an alkali metal permanganate. No. 2,034,197. Jacque C. Morrell to Universal Oil Products Co., both of Chicago.

Production petroleum distillate product. No. 2,034,274. LeRoy H. Story, Glenham, N. Y., to The Texas Co., N. Y. City.

Stabilization of petroleum distillate products against gum deterioration using polyhydric phenol. No. 2,034,283. Louis A. Clarke, Fishkill, and Harry Levin, Beacon, N. Y., to The Texas Co., N. Y. City.

Method stopping water flow in oil wells using a cellulosic solution. No. 2,034,347. Albert G. Loomis, Mount Lebanon Township, Allegheny County, and Abraham J. Teplitz and Henry A. Ambrose, Pittsburgh, Pa., to Gulf Research & Development Corp., Wilmington, Del.

Production castor oil composition by dissolving ordinary castor oil in mineral oil. No. 2,034,405. Frederick H. MacLaren, Calumet City, Ill., to Standard Oil Co., Chicago, Ill.

Solvent fractionation of motor fuel using sulfur dioxide and carbon dioxide. No. 2,034,495. Frederick W. Sullivan, Jr., Hammond, Ind., to Standard Oil Co., Chicago.

Production motor fuel for Diesel type engines. No. 2,034,643. Rene de M. Taveau, Newburgh, N. Y., to The Texas Co., N. Y. City.

Pigments

Purification of titanium sub-oxide materials by reacting siliceous impurities with fluorine. No. 2,031,750. Foord Von Bichowsky, Cleveland, Ohio, to Krebs Pigment & Color Corp., Wilmington, Del.

Production finely divided vat color pigments. No. 2,032,458. William A. Adamson to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production casein from skim milk. No. 2,034,056. David D. Peebles, Eureka, Cal., to Western Condensing Co., San Francisco.

Resins, Plastics, etc.

Production condensation products by reacting a phenol compound with an unsaturated fatty acid derivative. No. 2,031,586. Josef B napfl and Johannes Kuchenbuch, Krefeld-Uerdingen, Germany, to I. G., Frankfort-am-Main, Germany.

Production condensation products from alcohols and phenols. No. 2,031,719. Herbert Langwell and Charles Bernard Maddocks, Epsom, England.

Production cellulose derivative plastic containing an ester of diethylene glycol as plasticizer. No. 2,032,091. Harold S. Holt to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production resinous compound by reacting a tetramethylbutyphenol and formaldehyde. No. 2,033,091. Herman A. Bruson to The Resinous Products & Chemical Co., Inc., both of Philadelphia.

Production soap-forming condensation products of formaldehyde and an amine. No. 2,033,092. Herman A. Bruson to Rohm & Haas Co., both of Philadelphia.

Production condensation products of the carbamide-formaldehyde type. No. 2,033,718. Wilhelm Kraus, Vienna, Austria.

Production synthetic resins by condensation of aromatic amine and formaldehyde. No. 2,033,823. Alphonse Gams and Theodor Sutter, Basel, Switzerland, to Ciba Products Co., Dover, Del.

Production synthetic resins from aldehydes or ketones and phenol. No. 2,034,457. Howard L. Bender, Bloomfield, N. J., to Bakelite Corp., N. Y. City.

Urea-formaldehyde condensation process. No. 2,034,479. John Vincent MacDonough, Watertown, Mass., to Arthur D. Little, Inc., Cambridge, Mass.

Production synthetic resins of the amine-formaldehyde type. No. 2,034,597. Theodor Sutter, Basel, Switzerland, to Ciba Products Corp., Dover, Del.

Rubber

Use of latex coagulant in shoe protection. No. 2,031,674. Robert Schneider, Paris, and Armand Poelman, Charenton, France, to Materials Protector Corp., Newark, N. J.

Production rubber composition which contains petroleum resins. No. 2,031,944. Per K. Frolich, Roselle, N. J., to Standard Oil Development Co., a corp. of Del.

Method of coloring rubber goods by introducing dye in rubber layer at face of the form. No. 2,032,361. Merrill E. Hansen, Akron, and Carl L. Beal, Cuyahoga Falls, Ohio, to American Anode, Inc., Akron, Ohio.

Deposition of rubber from aqueous rubber dispersions. No. 2,032,452. Douglas Frank Twiss, Sutton Coldfield, England, to American Anode Inc., Akron, Ohio.

Production aqueous dispersions of rubber substances soluble salt of alcohol sulfate ester. No. 2,033,276. Robert Bertram Fisher Frank Clarke, Cheadle Hulme, and Hugh Mills Bunbury, Prestwich, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production fibrous rubber products. No. 2,033,480. Edward Arthur Murphy, Erdington, England, to Dunlop Rubber Co. Ltd., a British Corp.

Production antioxidant for rubber preservation. No. 2,034,491. Arthur W. Sloan, Akron, Ohio, to The B. F. Goodrich Co., N. Y. City.

Stabilization and preservation of rubber latex using aqueous solution of alkali silicate and potassium carbonate. No. 2,034,531. Alfred Thomas Blakey Kell, Beckenham, England.

Textile, Rayon

Production cellulose derivative coated fabric. No. 2,033,202. Dorman McBurney and Edgar H. Nollau, Newburgh, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Fixation of dyestuffs on textile fibers. No. 2,033,836. Louis Amedee Lantz and Alexander Lang Morrison to The Calico Printers' Ass'n, Ltd., all of Manchester, England.

Is Commercialism a Menace to Industry?

By Professor J. F. Thorpe

"IS Commercialism a Menace to Industry?" Whereas commercialism as a basic principle is a most desirable and, indeed, necessary method of progress towards national prosperity yet if applied without due thought or discretion it is apt to be a direct menace to industrial research, and therefore to industry as a whole. When commercialism and industrialism clash, industrialism retires defeated, but when they are not antagonistic they are mutually self-helpful and dependent.

The vast improvement in our industrial conditions which followed the war placed commercialism in its proper place, namely, in one of subservience rather than of dominance. The internal manufacture of essential materials was provided for and the necessary research work required to keep the economic balance and ensure the personnel necessary for progress in new discovery and in the new applications of old discoveries was present in an ever-flowing stream from the research schools of our universities to the research laboratories of the factories. Industry learnt to realize that there was no essential difference between the trained research worker and the supervisor in charge of works processes, and that a sound training in fundamental science was essential to both types.

A menace with which commercialism threatened industry was the purchase abroad not only of finished materials but also of processes. This kind of menace was in operation before the war, and it was one of the causes of our troubles that many firms had purchased—mainly from Germany—a man with a process who was installed in this country and given every facility to carry out his work. This form of menace was of a peculiarly subtle type, because it did not, at first sight, seem reasonable to suggest that the purchasing and operating in this country of new methods discovered abroad was bad for industry. Neither was it, provided the inevitable repercussion on our research organizations was mitigated and controlled by the complete transference of the method to this country so that it could be operated by our own people and improved by investigations carried out in our industrial research laboratories. But the greatest care must be taken to see that this method was applied only in the most special cases, otherwise the effect on our research organizations would ultimately lead to their extinction, and once extinguished they could never be revived. Sometimes, in the pre-war days, when a new process was introduced, when customers were accumulating and good business doing, the chemist who had been imported to control affairs would return to his own country, with full knowledge of the concern which he had been serving, and would operate for the benefit of a firm abroad, and cut out the business which he had helped to build up here.

It was only when the commercial instinct took charge and the desire to purchase from abroad became predominant that the true nature of the menace became apparent. The purchase of both materials and processes from outside meant that so much less chance was afforded our research schools to foster national industry and so much less chance was given them of placing their men in suitable employment. Unless industry supported its own research laboratories and through them the research training schools the latter could no longer exist. It was useless for industry to provide funds for the provision of research schools unless it could provide employment for those who passed through them.

America was probably hit just as seriously as we were by the withholding of essential supplies, which she could not provide for herself, during the war, but the tremendous internal resources of that great country prevented the same crisis arising, or, at any rate, rendered it less acute than here. The progress made in the application of research to the industries of both this country and the States had been nothing short of marvellous. The old empirical methods which lost us the dyestuffs industry—for the Perkin discovery was left to commercial men to develop—were no longer possible. The conditions which were mainly the cause of the depression in the cotton industry—namely, the reliance for too long on old discoveries—were not now likely to recur.

The American method of scrapping out-of-date machinery and replacing it by new and improved appliances was rapidly finding favor in this country where, for too long, the bogey of amortization had held sway. If progress was to continue, the same must be true of knowledge, for we must scrap the old ideas and give the new ones a chance, seeing to it that the genius of our own people was given full scope for development, and that it was not smothered by the blanket of commercial indifference. Those who were getting on in years could look back over a period of change and development such as no human being in any other generation could have surveyed.

What the next 50 years was likely to bring forth was a matter of surmise. It was difficult to imagine that progress would be as rapid or as novel as during the past half-century, although it was certain that we were on the eve of great advances in connection with various branches of science—organic chemistry in its relations to biology and medicine being one of the many in which far-reaching discoveries were likely to be made. But, whatever the nature of these discoveries, whatever their value to human nature might be, it was certain that the nation that made them and could utilize them industrially would be the one which would become predominant intellectually, mentally and financially. Let us therefore see to it that we possess a strong and ever reinforced army of research workers, and that we equip ourselves to occupy the place proper to our race and people.

If ever there were a country in need of industrial research and the provision of new knowledge and methods, surely it was ours. The coal age which gave such a tremendous impetus to our industries was passing, and already the oil age had taken strong hold. Too late we were devising all manner of schemes for utilizing of coal supplies for purposes applicable to modern conditions. New methods of utilization had to meet the competition of oil, and started severely handicapped in the race for economic existence. Nevertheless there had been a great and steadily-expanding advance in the attitude of industrialism towards industrial research—an advance which had to a large extent been due to the far-sighted policy of Imperial Chemical Industries. This organization had succeeded in bringing into line the main chemical research organizations to such a degree that it could no longer be said that the major portion of the potential power for investigation in this country was wasted. Those great sources of new knowledge and new methods, namely, our university laboratories, were being more and more utilized in the service of industry, and already there had been no small measure of reward. The clear vision which had produced this advance had seen beyond the immediate needs of industry, and had realized that a system of industry based on rule-of-thumb was but a house built on sand.

Prof. Thorpe, retiring president of the British Institute of Chemistry, raised a very pertinent question in his address when he attacked the policy of purchasing foreign processes rather than fostering domestic research. While his paper is written from the British viewpoint it contains much food for thought by American chemical executives. Digested from *Chemical Age*, Mar. 7, '36, p209.

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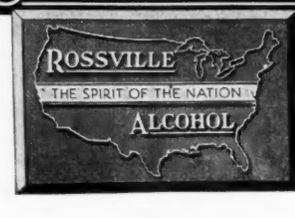

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Oil was now available in such enormous quantities and so easily obtainable that restriction, in the interests of commercialism, had to be placed on its production. Moreover, the combine of interests eliminated to a marked degree the occurrence of competition. In general, the engineering problems associated with production were of the simplest kind, and the methods of fractionation adopted left little to the skill of the chemist. The processes were wasteful and uneconomic to a degree, but since the provision of the final product was all that was required no one seemed to mind so long as dividends were maintained. As a matter of fact, petroleum could be made the source of a vast number of chemical products of service to man, and the fact that such products were lost was not due to bad business but to lack of enterprise. How long the nations would allow their natural resources to be frittered away would be determined only by the time it took those in authority to realize what was happening. Otherwise it will last until there ceases to be commercial profit in the undertaking, and by that time the oil position will be far worse than that of coal at the present time.

Few Scientific Men Directors

It is an amazing fact that so few scientific people are on the board of directors of companies dealing with industries based on scientific methods. Only the other day someone speaking after dinner to an audience of chemists said that no scientist should be on a board of directors because he would wreck the business within a week, the speaker's contention being that a scientific director would always be striving after something new, and would consequently scrap the older methods. His argument was evidently the old one namely, that the best is the enemy of the good; but what a specious argument.

There are definite indications that we are slipping back into the old bad way and that commercialism is gradually exerting its baneful influence on the research organizations. It is so easy for a commercial nation to lull itself into a false sense of security and well-being because the commercial method is so much simpler and more reliable—for a time—as an aid to financial profit than the path of the industrialist; yet it is a truism to say that unless one supported the other both must perish. We require a better understanding of research by the commercial people and a knowledge of its importance both to them and to the nation as a whole. If this could be acquired all will be well.

Flotation of Langbeinite from the Southwestern Potash Fields

By F. D. De Vaney and S. R. B. Cooke

THE potash mineral receiving the most attention in the newly discovered New Mexico-Texas potash district near Carlsbad, N. M., is sylvite (potassium chlorite). Sylvite contains more potassium than any other mineral. Merchantable high-grade deposits have been found, and those of lower grade may be enriched to a high degree of purity by refining methods. Deposits containing sylvite were the first to be developed and are the only ones being mined.

However, many other minerals that contain potash occur in the salt beds of the Carlsbad district. Of these the more important are polyhalite, carnallite, langbeinite, leonite, and kainite. The nature of the deposits and their mineralogy have been described in detail by members of the United States Geological Survey.[1]

Langbeinite, although not so abundant in these deposits as carnallite and sylvite, has particular interest because the potash is in the form of the sulfate and as such commands a premium in terms of K_2O units. This is explained by Fox and Turrentine,[2] who state:

The basis is the demand that fertilizers designed for certain crops, notably tobacco, shall be largely chlorine-free. It is this fact rather than the plant-food value of sulfur or the less objectionable properties of the sulfate as compared with the chloride radical that assign a value of $42 per ton for 90% potassium sulfate, as compared with $34 per ton for the 80% potassium chloride, or on a potassium oxide basis, of $87 per ton as sulfate, compared with $67 per ton for the chloride.

Smith[3] says, "It (langbeinite) is an excellent fertilizer and can readily be converted to the sulfate of potash for export trade."

Vast Amounts of Langbeinite Available

Drill records show the presence of beds of langbeinite that are thick enough to lead to the belief that large amounts are available. Much of the langbeinite is low-grade, and if the deposits are to be utilized a method of concentration must be developed.

Inasmuch as shafts have not been sunk to the langbeinite beds drill cores afforded the only material available for concentration studies. The sample came from Government test well 17 in sect. 27, T. 20 S., R. 33 E., Lea County, N. Mex., and was supplied by the U. S. Geological Survey. The horizon from which the cores came was between 2,514 and 2,560 ft. Material sent to Rolla was not a true sample of the bed, as the best of the specimens containing langbeinite had been reserved for museum use. The low-grade material remaining constituted the ore on which concentration tests were made and all tests were of necessity made with small lots.

Physical and Chemical Properties

Langbeinite is a double sulfate of potassium and magnesium having the composition $K_2SO_4.2MgSO_4$. The pure mineral contains 22.7% K_2O, 19.5% MgO, and 57.8% SO_3. In the sample examined the langbeinite occurred as small crystals ranging in color from white to faint pink. The mineral has a specific gravity of 2.858. Its hardness, 3 to 4, is high for a potash mineral. It may be distinguished from halite, with which it is usually associated, by the fact that it is tasteless and has a conchoidal or irregular fracture with no cleavage. Langbeinite effloresces slightly, and cores exposed to the air show a white efflorescence due to the alteration of langbeinite to some of the hydrous magnesium sulfates. As langbeinite is much less soluble in cold water than halite or sylvite some idea of the amount of langbeinite present may be gained by a quick wash; the chlorides dissolve rapidly and leave practically all the langbeinite as residue. Langbeinite occurs in granular form but more commonly as tetrahedrons which sometimes show characteristic triangular outlines on the core surface. Optically it is isotropic and has an index of refraction of 1.533.

The cores examined consisted essentially of 2 minerals, langbeinite and halite, in the proportion by weight of approximately 1 part of langbeinite to 4 of halite. The analysis of the sample used was 4.75% K_2O. The halite crystals were much larger than the langbeinite.

Suggested Methods of Concentration

Methods used in concentrating the sylvite ore from this district[4] suggested that langbeinite might be concentrated. Both the microscope and heavy liquids were used in the study of mineral association. These methods indicated that much finer grinding would be necessary to liberate langbeinite from halite than was required for the sylvite. Float-and-sink tests showed that only a small percentage of langbeinite is free at sizes coarser than 10-mesh. The results of these tests are given in Table 1. The tests and microscopic examination indicated that if good recoveries of high-grade concentrates are to be made by physical separation grinding to 65-mesh is essential.

Table 1.—Float-and-sink tests of langbeinite

Size, mesh	*Product*	*Weight, per cent.*	*Assay, per cent. K_2O*	*Per cent of total K_2O*
	Float on 2.75 sp. gr.	92.4	4.79	74.9
— 6 + 8	Sink in 2.75	7.6	19.48	25.1
	Composite	100.0	5.90	100.0
	Float on 2.75	90.7	3.30	62.2
— 8 + 10	Sink in 2.75	9.3	19.58	37.8
	Composite	100.0	4.81	100.0
	Float on 2.75	81.9	0.5[1]	9.4
— 65 + 150	Sink in 2.75 sp. gr.	18.1	22.0[1]	90.6
	Composite	100.0	4.4	100.0

[1] Microscopic estimate.

The specific gravity of langbeinite is 2.86, whereas that of halite is 2.15. Inasmuch as the specific gravity of a brine saturated with respect to halite and the components of langbeinite is 1.30 at room temperature, the density of langbeinite relative to halite is 1 to 1.83. Such a range is more than ample to permit separation by tables if tabling were otherwise feasible. However, because of the necessity of grinding to 65-mesh, tabling is not promising. Selective agglomeration, too, as a possible concentration method does not appear promising owing to the fineness to which the ore must be crushed for liberation.

When the investigation was begun it was hoped that a flotation process employing the same type of collectors as in the separation of sylvite from halite would be applicable for the separation of langbeinite from halite. This hope was fulfilled; by using a sulfated aliphatic alcohol it was found that the langbeinite could be floated away from the halite satisfactorily.

In the laboratory tests an ore crushed to 100-mesh was conditioned for a short time in a thick pulp with the reagent, Avirol 80. Brine saturated with respect to the ore—that is, as to sodium chloride, potassium sulfate, and magnesium sulfate—was used as the flotation medium. The specific gravity of this brine at 25° C. was 1.30. After the ore was conditioned brine was added to give a pulp consistency of 25% solids.

Rougher concentrates and finished tailings were made in the 1st flotation cell. The rougher concentrates were recleaned in a 2nd cell, giving finished concentrates and middlings. No additional reagents were added in the cleaner cell. As much brine as possible was removed from the concentrates, middlings, and tailings immediately after flotation by filtration and centrifuging. The results of one of the limited number of flotation tests are given in table 2.

Table 2.—Flotation test of langbeinite ore

Product	*Weight, per cent.*	*Assay, per cent. K_2O*	*Calculated as langbeinite, per cent.*	*Per cent. of total K_2O*
Cleaner concentrates..	14.2	21.68	95.5	72.6
Middlings	8.8	5.51	24.2	11.4
Rougher tailings	77.0	.88	3.9	16.0
Composite	100.0	4.24	18.7	100.0

High-grade concentrates approaching the theoretical analysis of langbeinite were made with a fair recovery. The middlings consisted of unlocked langbeinite and halite and undoubtedly could be re-treated to recover more langbeinite. The fact that the tailings in the tests are somewhat higher than desirable does not necessarily mean that they cannot be improved.

Just how much reagent would be required in practice where the brine would be recirculated is not known. The amounts used are believed to be small and comparable with those required in the laboratory flotation of sylvite from halite.

Flotation of the langbeinite is rapid and positive, not over 5 minutes being required to complete a batch test. The separation is not unduly sensitive to small changes in amount of reagent, pulp consistency, or temperature. Reprinted from U. S. Bureau of Mines Report of Investigations 3300. The paper represents the results of work done under a cooperative agreement between the Bureau of Mines and the Missouri School of Mines and Metallurgy, Rolla, Mo.

[1] Schaller, W. T., and Henderson, E. P., Mineralogy of Drill Cores from the Potash Field of New Mexico and Texas: U. S. Geol. Survey Bull. 833, 1932, 124 pp. Smith, H. I., Potash Development in Southeastern New Mexico; Contr. 52, Am. Inst. Min. and Met. Eng., 1933.

[2] Fox, E. J., and Turrentine, J. W., Potassium Sulfate: *Ind. and Eng. Chem.*, vol. 26, 1934, p. 493.

[3] See footnote 2.

[4] Coghill, W. H., DeVaney, F. D., Clemmer, J. B., and Cooke, S. R. B., Concentration of the Potash Ores of Carlsbad, N. Mex., by Ore-Dressing Methods; Rept. of Investigations 3271, Bureau of Mines, February 1935, 13 pp.

Heavy Chemicals

Water-Soluble Aluminum Phosphate Sulfates

Preparation and use of water-soluble aluminum phosphate sulfates is the subject of E.P. 440,400 (complete specification accepted Dec. 16, 1935) that has been granted to Peter Spence and Sons, Ltd., of Manchester. Solid water-soluble combinations of alumina, phosphoric and sulfuric acids have not hitherto been produced or obtainable in commerce.

Patentees have found, however, that it is possible to prepare clear and stable basic, neutral or acid aluminum phosphate sulfate solutions containing substantially lower proportions of aluminum sulfate to aluminum phosphate than hitherto known to exist in clear solution, and that from the new solutions, new water-soluble solids containing such lower proportions of aluminum sulfate to aluminum phosphate can be obtained.

According to the invention solutions of aluminum phosphate sulfates are prepared by bringing the 3 components, alumina, phosphoric acid and sulfuric acid together under conditions of concentration and temperature to form clear and stable solutions containing more than one molecule of aluminum phosphate $Al_2(PO_4)_2$ to 2 molecules of aluminum sulfate—*i.e.*, a molecular ratio of phosphoric acid to alumina higher than 0.33 molecule P_2O_5: one molecule Al_2O_3. By evaporating the solutions, water-soluble solids—*e.g.*, in the form of small fragments—containing the higher ratio of aluminum phosphate to aluminum sulfate are obtained. By adding further phosphoric acid the molecular ratio of the phosphoric acid to alumina may be increased to 0.75 molecule P_2O_5: one molecule Al_2O_3.

New compounds have the property of decomposing in aqueous solution, without the addition of alkali, with precipitation of a very high proportion of their contained alumina and phosphoric acid when clear solutions thereof are heated at suitable strengths and temperatures, increased dilution and temperature tending towards increased precipitation. The decomposition may be assisted by adding a neutralizing reagent—*e.g.*, sodium carbonate. The precipitates formed by such decomposition normally consist of basic aluminum phosphates with varying ratios of Al_2O_3 to P_2O_5, according to the original composition and the conditions of decomposition, usually containing a small proportion of SO_3, and may be in bulky flocculent state, eminently suitable for use in arts—*e.g.*, as bases for color lakes and for other purposes.

By virtue of this property of decomposing in aqueous solution under controllable conditions, these new soluble aluminum phosphate sulfates are, it is claimed, of special value as textile mordants, and may also be used in the sizing of paper (to precipitate aluminum phosphate therein), in the treatment of leather in mineral tannage and in the purification of water with novel advantageous effects.

In one of the examples given in the specification, a hot solution of a suitable alkali phosphate—*e.g.*, a solution of trisodium phosphate at about 1.2 sp. gr., and a hot solution of aluminum sulfate at about 1.4 or 1.5 sp. gr. are mixed, in proportions such as to provide a stable mixed solution having a ratio of from about 0.5 molecule P_2O_5: one molecule Al_2O_3, which is equivalent to $Al_2O_3 3SO_3$: $Al_2O_3 P_2O_5$, to about 0.66 molecule P_2O_5: one molecule Al_2O_3, which is equivalent to $Al_2O_3 3SO_3$:

$2(Al_2O_3P_2O_5)$. Mixed solution may be evaporated at suitable temperatures below its normal boiling temperature—*e.g.*, under vacuum—to yield a solid product which may conveniently contain about 18 per cent. Al_2O_3, and is completely soluble in cold water. *Chemical Trade Journal,* British, Feb. 21, '36, p151.

Sulfur Dioxide Recovery

Pure sulfur dioxide is recovered from roaster gases containing 1% of the material by volume. Process depends upon the utilization as absorption agents of a mixture of aromatic amines (e.g., crude xylidine or crude toluidine) and water. Efficiency of this mixture is stated to be 15 to 20 times as great as that of water alone. Reagent is prepared by the decomposition of sulfates of the aromatic bases with alkali, the sodium sulfate produced at the same time having no adverse effect on the process. H. Weidmann and E. Roesner, *Mitt Metallgesellschaft,* '35, 11, 7-13.

Plant Equipment

Most Suitable Woods for Tanks

In an endeavor to determine the most suitable Australian woods for the construction of tanks, pipes, launders, scrubbers, impellers, and other equipment used in chemical and metallurgical works, a valuable series of experiments was carried out by M. B. Welch,* of the technological museum, Sydney, between February, '33, and August, '35. Timber slats were weighed, accurately measured to 0.001 in. and immersed in aqueous solutions of the chemicals at atmospheric temperature. Experiment was commenced in February, '33, and the slats were examined at intervals. Majority were left until August, '35, when they were again weighed and measured. Timbers under test and their behavior in respect of swelling are shown in the table below, from which it is seen that pine timbers are the most resistant to chemical action. *Chemical Engineering & Mining Review,* Feb. 8, '36, p136.

* "The Effect of Chemical Solutions on Some Woods," by M. B. Welch. Proceedings Royal Society of New South Wales, Vol. LXIX.

Acid-Resistant Carbon Linings

Acid-resistant carbon linings for chemical equipment, made by a process resembling that used in the production of carbon electrodes, have attracted considerable attention in the German chemical industry. Selected carbonaceous material in the comminuted form is calcined and pulverized in the absence of air; the powdered material is incorporated with a binder (tar) and moulded in hydraulic presses. Finally, the sheets are again exposed to intense heat to carbonize the binder and eliminate volatile ingredients. These linings were tested out in cellulose pulp digesters in contact with hot 70% sulfuric acid for several hours, and it apears that they suffered slight loss in weight at the commencement of treatment only. Linings of a ceramic material tested under identical conditions underwent continuous loss in weight. Dr. F. Hoffman, *Chemische Fabrik,* Feb. 19, '36.

Coal-Tar Chemicals

Sulfur Extraction from Benzol

A continuous process for the extraction of sulfur from crude benzols by physical means is claimed in E.P. 441,518 of 1935 (complete specification accepted Jan. 21, 1936) that has been granted to the Société des Etablissements Barbet of Paris. Crude benzol is subjected to a first rectification in a column comprising plates in order to effect the total extraction of the carbon bisulfide, the vapors escaping from the top of the column which are rich in carbon bisulfide, after condensation, being decanted in order to separate the water. Part of the condensate is returned to the column in order to constitute the reflux liquid, while the other part is sent into a 2nd rectifying column in order to extract from it, on the one hand the very light products boiling before carbon bisulfide, and on the other hand commercial carbon bisulfide. Benzol issuing from the 1st column, freed from carbon bisulfide to which may be joined the residual liquid from the 2nd column, is sent into a 3rd column for its separation into benzol and toluol, while an extraction rich in thiophene is effected towards the top of the column so that the benzol is practically freed from the sulfur it contained.

Table Showing Percentage of Swelling Based on Air Dried Sample

Timber	H_2SO_4 10%	H_2SO_4 50%	HNO_3 5%	HNO_3 25%	HCl. 10%	HCl. 50%	HCl. 100%	NaOH 5%	NaOH 20%	NaOH 40%	NH_4OH 50%	Acetic Acid 50%	Na_2CO_3 Sat. Sol.	NaCl. Sat. Sol.	H_2O	Cut*
Celery Pine	1.0	0.5	3.3	1.4	3.4	3.5	...	...	0.9	1.2	1.3	2.5	0.8	0.6	1.2	Q
Huon Pine	1.7	0.3	1.9	1.4	1.9	1.5	1.5	2.4	0.9	...	2.5	2.8	2.2	1.7	2.1	Q
Macquarie Pine	1.8	2.3	4.6	2.1	3.1	3.8	2.0	3.4	3.5	...	5.4	3.2	6.2	2.6	2.2	O
Hoop Pine	3.2	3.9	3.6	3.3	3.8	3.7	5.3	5.7	4.7	2.6	5.8	4.8	3.1	2.7	4.4	B
Queensland Kauri	3.6	1.6	4.1	2.0	2.2	2.6	...	3.4	6.2	1.6	3.9	4.3	2.0	2.9	3.6	O
Radiata Pine	3.5	3.8	5.1	4.3	2.8	3.9	...	4.6	4.9	5.8	5.2	5.2	4.0	3.0	4.8	O
Port Orford Cedar	2.7	2.1	2.9	2.2	1.6	2.7	2.9	2.6	1.9	1.7	3.3	3.4	2.8	2.3	2.7	Q
Tallowwood	4.7	7.0	4.9	7.2	4.1	7.3	...	7.2	...	12.6	7.7	8.7	4.8	5.0	6.4	O
Blue Gum	8.2	5.4	11.5	12.8	9.3	8.9	...	12.9	12.5	18.1	7.5	4.1	10.7	4.0	7.0	Q
Spotted Gum	3.2	2.1	2.7	6.3	6.4	...	...	10.9	6.2	5.4	3.2	3.2	2.9	2.5	2.9	Q
Blackbutt	6.1	7.2	7.4	6.3	8.8	7.7	...	9.6	24.2	29.5	10.3	8.6	7.2	5.0	6.0	B
Turpentine	6.8	3.7	6.5	7.7	6.3	6.7	...	6.7	3.4	7.0	7.2	7.0	6.7	4.7	7.1	Q
Brush Box	2.9	3.6	3.4	6.8	10.0	6.9	...	8.7	13.2	29.3	7.9	7.3	6.6	5.1	6.5	O
Rosewood	1.8	1.5	2.9	5.0	3.6	4.1	...	6.4	9.0	...	4.5	5.6	4.9	2.8	4.0	O
Teak	4.1	2.4	4.2	4.7	2.6	3.8	...	5.4	6.8	10.4	4.6	3.9	3.6	3.5	4.7	B
Coachwood	2.7	2.2	3.3	2.4	4.0	...	...	2.5	...	...	3.9	5.8	4.2	3.3	3.2	Q
Red Carabeen	2.9	3.7	3.0	3.1	3.2	...	...	4.5	4.3	...	4.4	3.2	4.1	2.3	5.6	Q
Crab Apple	4.1	1.0	2.7	2.5	3.0	...	...	1.7	...	3.2	3.7	3.3	2.8	2.3	3.1	Q
Corkwood	9.8	3.3	5.3	5.7	4.0	4.8	...	13.7	...	...	3.6	3.6	4.2	7.6	8.0	O
Bolly Gum	5.2	3.2	4.0	5.9	3.7	...	...	8.1	6.7	15.8	2.7	3.7	3.6	3.4	4.0	O
Sycamore	5.7	4.8	7.0	6.7	6.8	5.6	9.0	9.5	11.8	10.0	8.8	8.1	8.4	7.0	7.4	B
Beech	1.3	2.9	7.0	3.5	3.1	2.8	...	2.1	6.6	7.7	4.8	6.2	5.3	4.3	3.2	Q
Yellow Carabeen	5.4	9.3	5.6	5.1	5.9	7.4	...	10.1	5.5	9.1	8.6	8.1	6.1	4.6	6.9	B
Sassafras	4.9	3.7	4.8	4.2	3.8	4.3	...	6.6	10.3	5.9	5.8	5.0	5.5	3.9	5.5	O
N. S. Wales Maple	7.8	4.3	8.5	7.9	3.3	...	...	10.4	14.1	5.6	2.1	7.8	3.6	3.8	2.4	Q
Macquarie Beech	4.0	3.7	4.4	4.3	4.2	...	...	...	6.9	7.2	6.9	5.4	5.0	4.7	3.9	B
Mean	4.2	3.4	4.8	4.8	4.4	4.8	4.1	6.6	7.5	9.5	5.2	5.2	4.7	3.6	4.6	

* Q = Quarter-cut. O = Oblique. B = Tangentially cut or "backed-off."

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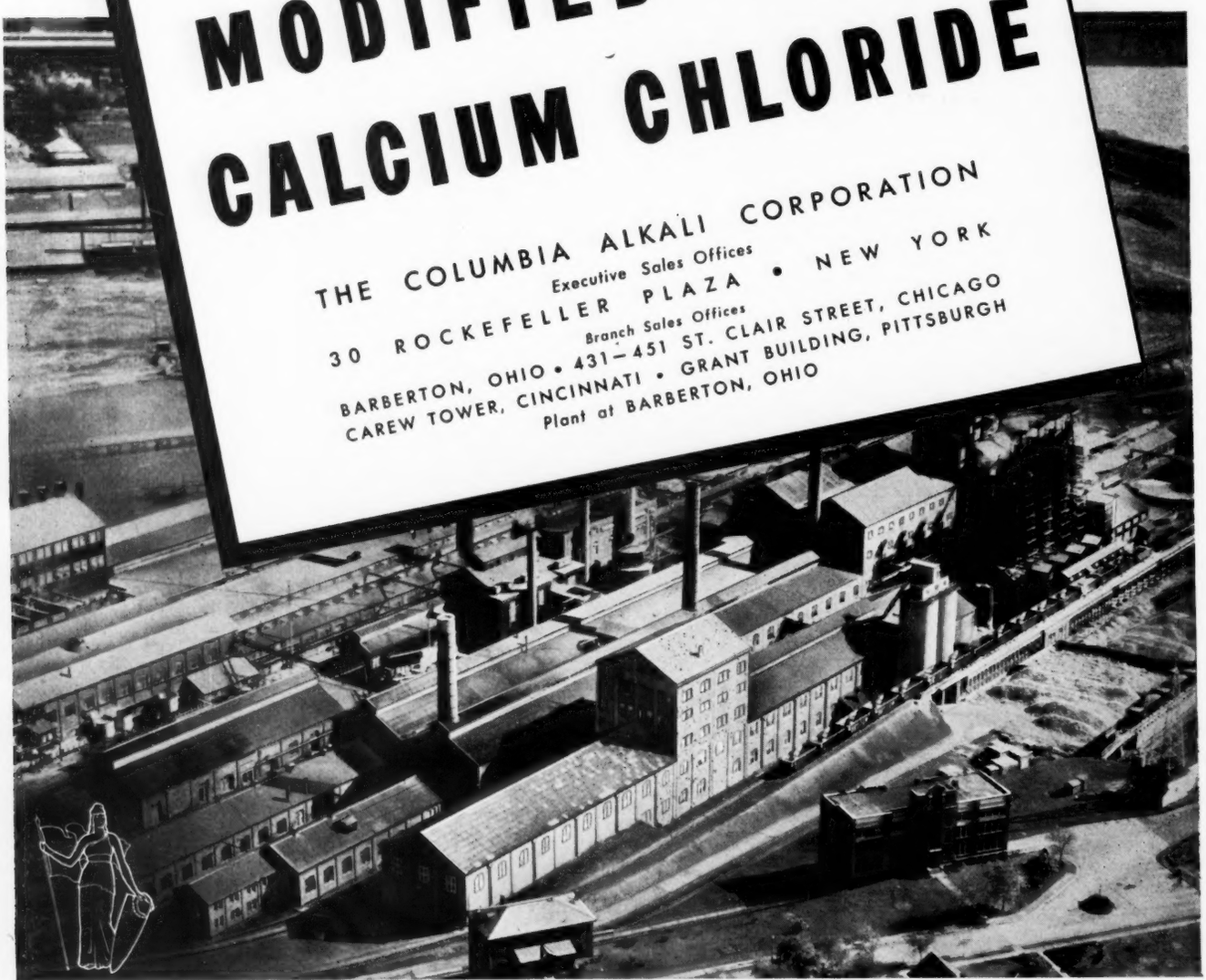

AERIAL VIEW OF PLANT AT BARBERTON, OHIO

Plant Operation

Soybean Oil Extraction Methods Reviewed

Various constructions of continuous extraction apparatus utilize the same general principle of a solvent flowing through the material and the extractor in continuous countercurrent. In the Hildebrandt system, most generally used in the U. S., seed is moved through a U-shaped cylinder through which benzine flows in the opposite direction. In drying the extracted meal, the benzine is entirely removed by the heating. The oil mixture is cleaned, decolored, and the benzine is separated by continuous distillation.

The development of the process of continuous extraction by solvents has resulted in the following advantages over the old expeller process: a greater net profit from a larger yield of oil; a smaller production cost; the production of a higher quality of oil; and the production of lecithin from soybean oil. Oil residue in extracted meal is low, maximum 0.8%, whereas the oil residue in press cake at the minimum is 5%. The price for the extracted meal, even lower in oil content, is the same as for the press cake; hence the greater oil yield is net profit. Production cost by extraction is less because of less labor involved, practically no depreciation or repairs in machinery, the maintenance of little driving power, and less consumption of steam during the actual production period, and in the elimination of the predrying period necessary in the expeller process. The only loss in production is in the loss of the solvent, which under a good extraction system should not exceed 0.6% of the weight of beans worked.

By the extraction method, approximately a 100% yield of lecithin content of soybeans can be produced, whereas it is well known that lecithin production from soybean oil is impossible by the old expeller process. At present there are available satisfactory solvents and adequate machinery to effect complete removal of solvents from the products. "The Solvent Extraction of Soybeans," by N. T. Spoerri, paper delivered at the April A. C. S. Kansas City meeting.

Bleaching Earths Efficiencies

A new process for augmenting the filtering and decolorizing efficiency of bleaching earths (French Pat. 791,148) is based upon the observations that dispersion of a bleaching earth in water is most thorough when the *p*H of the medium is nine, that the filtering efficiency is a function of the quantity of gelatinous silica in the material, and that the decolorizing power is a function of the amorphous silica content. It is consequently proposed to subject bleaching earths to physical, chemical and physico-chemical treatment with a view to depositing silica in the interior of the mass. A hallyositic clay, for example, is treated in suspension in boiling water with sufficient alkali silicate to produce a *p*H of about nine, whereupon the homogeneous milk is acidified while boiling in order to precipitate silica.

Chemical Plant Accounting

Importance of obtaining an accurate measurement of overhead cost per unit of production is a prime necessity in any business, but more especially in the chemical trades. To a large extent chemical manufacturing processes involve the use of expensive plant and machinery, with the result that the incidence of overhead expense in ratio to the total cost is much higher. In many businesses it is quite common to find that, compared with overhead expenses, actual direct labor and material represent a relatively small proportion of the total cost. Frequently, no attempt is made to apportion overhead expenses to each individual department or process, but this is an essential requirement of sound costing practice for the chemical trades. Many chemical products are the result of work involved at a number of distinct processes where by-products are extracted. In these circumstances, therefore, the need for a correct apportionment of overhead expenses will be quite apparent.

Factory overhead expenses fall into two main categories, examples of which are as follows:

Fixed Expenses: Depreciation of plant and buildings; rates; taxes; ground burdens; salaries of directors and works manager; repairs and maintenance of buildings.

Variable Expenses: Repairs and maintenance of plant and machinery; timekeeping and employment department; storekeeping and stores control; lighting and heating; inspection and testing; national insurance; workmen's compensation insurance; research and experiments; laboratories; welfare; indirect labor; clerical and works executive salaries; general office expenses.

Fixed expenses will remain unchanged, irrespective of the volume of output obtained, whereas the variable expenses are more or less governed by the volume of output. These variable expenses, however, for the most part, will not be increased in direct ratio to an increase in the volume of production. It will therefore be seen that, in the composition of factory overheads, there are three factors, viz., fixed, fully variable, and partly variable, all in relation to the volume of production. In view of this, it will be appreciated that the most economical recovery of factory overheads will be obtained when the plant is employed at normal or full capacity, and that when output is below normal a higher overhead cost per unit of production will result. Author then discusses such subjects as budgetary control; normal capacity, idle capacity, etc. Specific accounting examples are given. "Cost Accountancy for Chemical Works, Part III, Factory Overhead Expenses," by L. A. Wight, *The Industrial Chemist*, British, March, p134.

The Literature

Articles of interest to the chemical and process industries particularly noted in a monthly review of the U. S. and foreign periodicals.

Coal Hydrogenation. "Early History of the Bergius Process." This is the first public report of the investigations which have led to England's important "oil from coal" plant at Billingham. *The Chemical Age*, February 29, p191.

Gases. "The Gases of War," by Arthur Marshall. A none too pleasant report of actual war-time use of various well-known gases. Choking gases, irritants, lachrymators, and blister gases are discussed. *Nature*, February 15, p256.

Luminescent Chemicals. "Luminescent Sulphides Bring Television Nearer." A brief review of research carried on during the past few years which has increased the efficiency of the cathode-ray tube for both television and physico-chemical research use. *The Chemical Trade Journal & Chemical Engineer*, March 6, p191.

Ore Treatment. "Cyanidation Then Flotation," by Charles E. Blackett. This extremely short review of the new Kalgoorlie, W. Australia, ore treatment plant is supplemented by a flow sheet showing the complete process and listing the exact equipment used in each step of the treatment. *Chemical Engineering & Mining Review*, February 8, p133.

Plastics. "Plasticizers in Cellulose Ester Plastics," by Dr. Thos. H. Durrans and D. G. Davidson. Though quite technical, this discussion of the properties imparted to plastics by numerous plasticizers now in use is thoroughly usable. The article is remarkably complete. *Chemistry & Industry*, February 28, p162.

Potash. "Chemicals From the Dead Sea—How The Potash-Production Problem Was Solved," by M. A. Novomeysky. One of a series of articles describing investigations into the chemical resources of the Dead Sea. This article deals with production of high grade potash on an industrial scale. *The Chemical Trade Journal & Chemical Engineer*, March 13, p213.

Research. "Some Contributions of Crystal Structure Research to General Chemistry Teaching," by Maurice L. Huggins. Studies of simple crystal structure aid greatly in the understanding of fundamental chemical principles. Huggins' article throws considerable light on the structure of titanium pigments by such study. *Journal of Chemical Education*, April, p160.

Resins. "Synthetic Resins and Their Application to Textiles," by D. H. Powers. The fertile field offered by development of crease-resisting fabrics prompt this discussion of how resins are used and what type resins are best adapted for use. *The Dyer & Textile Printer*, February 28, p218.

Rubber. "Ammonia in the Vulcanization of Rubber," by Dr. J. F. T. Berliner and L. H. Brandt. Advantages gained by use of this recently-developed adjunct to vulcanization, and the methods used to introduce ammonia into the process, are briefly discussed. *The Rubber Age*, March, p323.

Solvent Recovery. "Solvent Recovery in the Rubber Industry." Article reveals that activated carbon is most greatly used in meeting rubber industries' solvent recovery problems. Descriptions of various typical installations gives a good general idea of how problems are being met and solved. *Synthetic & Applied Finishes*, Feoruary, p269.

Sulfonated Oils. "Sulfonated (Sulfated) Oils, and Other Products of This Industry." A reprint of the valuable Handbook of Data relating to this type of oils, appearing in *Textile Colorist*, p161, by courtesy of the Sulphonated Oil Manufacturers Association. A complete discussion of the analytical methods employed and recognized by the Association.

Water Purification. "Dry Feeding Chemicals—Some Experiences at Norfolk, Va.," by R. W. Fitzgerald. Advantages in the use of dry feed and the equipment used in this system are briefly discussed. Article includes several simple sketches of various type dry-feeders. *Water Works & Sewerage*, February, p58.

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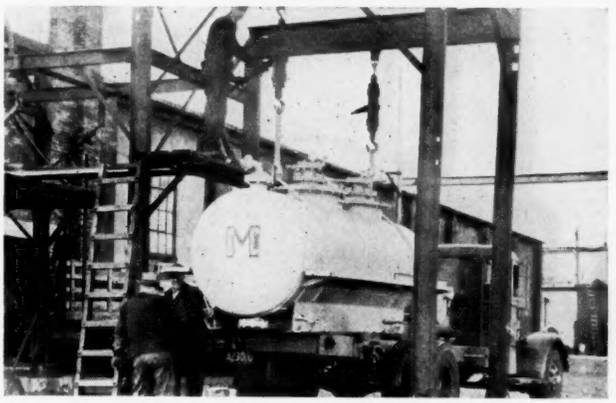
Rubber-Lined Removable Tanks for Trucks

Photograph, reproduced below, shows one of the 3 steel truck tanks, lined with Goodrich rubber, which are used by Merrimac Chemical, Everett, Mass., as a means of speeding up their local delivery of acid. Tank is filled while suspended from the loading platform and is then lowered onto the truck chassis to form a complete tank truck unit. When the truck returns, the empty tank is removed and a full one quickly attached.



Merrimac speeds up tank wagon deliveries through the use of removable tanks. Loading time is greatly reduced and efficient service is given with minimum trucking equipment.

This system greatly reduces loading time and enables this company to maintain efficient service with minimum trucking equipment. Two of the tanks are used for sodium hypochlorite and one for muriatic acid.

How to Store Dangerous Chemicals

"Makers of 'Forbidden Commodities' Demand a Specialized Service" is an article, while written from the public warehouseman's viewpoint, of definite interest to the shipper, jobber and user of chemicals shipped with red, yellow or green labels. Those who are charged with the responsibilities of storing such chemicals will find in this article considerable information of value. A very comprehensive list of such chemicals is given; a number of practical suggestions on storage as well as some of the rules and regulations that must be complied with are enumerated. *Distribution and Warehousing*, February, '36, p7.

New Inflammable Drum Labels

The Manufacturing Chemists' Association, 608 Woodward Bldg., Washington, D. C., has adopted as standard label D-38 for returnable steel drums containing certain inflammable products, such as solvents, alcohol, thinners, lacquers, etc., and D-38-A label for non-returnable drums, and is prepared to furnish these labels in any quantities at reasonable cost. The labels are 4" x 6", on white paper, ungummed, printed in red and black, and should be pasted on all such drums close to the main body plug with the arrow directed to the plug.

CONTENTS INFLAMMABLE
TRANSPORTATION COMPANIES:
KEEP BUNGS TIGHTLY CLOSED
KEEP DRUM OUT OF SUN AND AWAY FROM HEAT
CONSIGNEE:
KEEP BUNGS TIGHTLY CLOSED
KEEP DRUM OUT OF SUN AND AWAY FROM HEAT
DO NOT EMPTY THIS DRUM BY PRESSURE
REPLACE BUNGS AS SOON AS DRUM IS EMPTY
Drum Should Not Be Washed Out Or Contaminated With Other Materials
KEEP NAKED LIGHTS AND FIRE AWAY FROM DRUM
THIS DRUM IS RETURNABLE

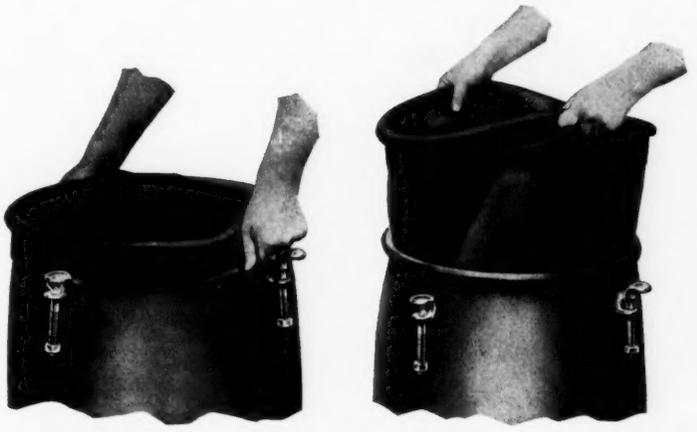
New labels for inflammable shipments.

Change in Cottonseed Rates Approved

I. C. C. has granted authority for the establishment of rates on cottonseed and its products, in straight or mixed carloads between points in Southern territory and points in zones I and II of the North-Central region, which may be higher between intermediate points than between more distant points. Commission has also granted authority to establish under certain conditions, lower rates on cottonseed and its products, carloads, between intermediate points from Virginia and North Carolina to destinations in Trunk Line and New England territory, without reducing the through rates, and from West Memphis, Evandale, Osceola, and Blytheville, Ark., and Sikeston, Mo., to points in Official Territory while maintaining higher rates to intermediate points.

Commission has also granted authority to establish lower rates on vegetable and animal oils and olive oil foods, carloads, from certain North Atlantic ports to destinations in Trunk Line and Central territories without reducing through rates. Applicants contend that such rates will make possible the shipment of domestic oils refined at the ports on a parity with imported products.

"Snap-In" Rubber Barrel Liner

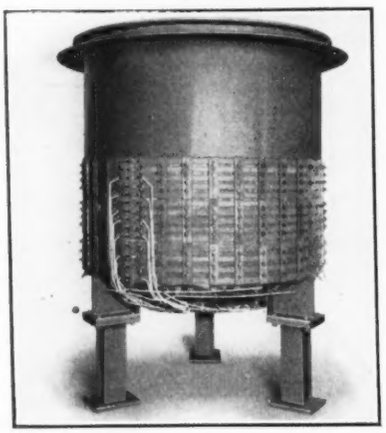


The so-called "Snap-In" rubber barrel liner provides a safe and economical method for handling sodium hypochlorite, laundry bleach, and other chemicals. Liner is essentially a vulcanized special-quality rubber bag adapted to fit closely in a steel barrel and having sufficient length to permit its top to be stretched or snapped over the round edge of the barrel to secure the liner in place. Relining requires but a few minutes; then the barrels again are placed in service. Leakage at the cover is eliminated by the positive closure which is easy of operation and designed to compensate for any slight deformity in the cover or barrel. The Whitehead Bros. Rubber Co., Trenton, is the manufacturer.

New Equipment

New Electrically Heated Process Kettles QC 345

New line of electrically heated process kettles which are ideal for food and chemical process work, also for oil treating and for the manufacture of synthetics are on the market. These kettles can be supplied in stainless steel, aluminum, plain steel and other materials. They are supplied with automatic control and are extremely safe. These kettles are built in 100, 250, 500 and 1000 gals. capacity regularly, but can be supplied in special sizes as well. Manufacturer can produce these to fit special conditions.



Remote Hand Control Announced QC 346

To supplement automatic control systems one of the large instrument makers has developed a new remote hand control. In many processes, automatic controllers stabilize the operation to such an extent that many non-critical flows may be governed by hand valves, which need be readjusted very infrequently. However, if these hand valves are not easily accessible, it is only natural that even the few necessary adjustments will be neglected. Where these conditions exist, a remote hand control mounted on a centrally-located panel enables the operator to adjust manually the degree of opening of an out-of-the way, inaccessible valve without moving from his station. With it, he can reset a valve several hundred feet away to control temperature, pressure, flow or liquid level using readings from his recording instruments to guide him in making the correct adjustments.

More Accurate Portable Thermometer QC 347

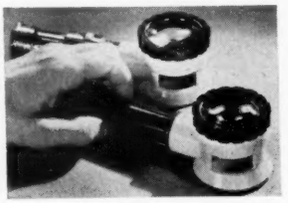
Accompanying photograph shows at a glance an improvement that has been made in one type of portable recording thermometer; the sensitive element (bulb) has been located where it will respond quickly and accurately to changes in the surrounding temperature. Mounted out in the clear, the mercury-filled bulb is subjected to the natural air currents and, therefore, records true temperatures. New design also results in greater sensitivity since the measuring system is in no way affected by the temperature of the instrument case. This is important since many portable thermometers have the bulb mounted in such a way that the bulb is subjected to the temperature of the instrument case. Due to the large mass of metal, it is easy to see why such construction makes such an instrument extremely sluggish.

A Spectrum Measuring Microscope QC 348

A new spectrum measuring microscope has just been designed for the rapid and precise measurement of the linear intervals between spectrum lines on the photographic plate. Its precision and accuracy, however, make it applicable to a wide range of work, such as the examination of shrinkage and expansion of photographic films in aerial mapping, measurement of thermal expansion of metals and the elongation of test specimens in creep tests under load.

Handy Magnifying Glass QC 349

Giving 5-power magnification with illumination of the field of vision, the new Pike "Flash-O-Lens," should prove invaluable wherever magnification is required. Instrument employs a double lens system which provides 5-power magnification in a 2-inch field. An accurate spacer ring of lustrous Bakelite Molded holds the lenses in exact focus. A white composition frame is employed to reflect the light. A side opening in the frame makes it possible to use instruments or a pencil while examining an object.



Temperature Control Colloid Mill QC 350

A new temperature control vertical type of colloid mill (in various sizes from the small laboratory model to industrial sizes) makes it possible for the chemist to process material on a continuous production basis. In experimenting, a small amount of the material can be used and by-passed to allow the material to circulate around, while the adjustment gap is set to the desired fineness and then the entire sample is discharged. The bypass arrangement makes it possible for inexperienced operators to fill directly into jars and containers, using the mill as a production unit and filling machine. The industrial type units are called upon to discharge directly into drums, tank cars, etc. Elimination of any possible air and the discharging of the finished material with temperature control are only a few of the features.

pH Electrometer with Novel Features QC 351

A new pH electrometer features factory sealed glass and calomel electrodes, already prepared for use. Accuracy of .05 pH is claimed for this self-contained instrument and use in both low and high pH range make it of special interest.

Chemical Industries,
25 Spruce St., N. Y. City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 345	QC 349
" 346	" 350
" 347	" 351
" 348	

Name .....

Title ..... **Company** .....

Address .....

HIGHEST PURITY...

—an all important factor in the manufacture of Diamond Liquid Chlorine and a guarantee to industry of full strength and constant uniformity in all processes.

Whether you use it as an oxidizer or bleaching agent, water purification or sanitation agent—you can always depend on the quality of Diamond Liquid Chlorine to meet the most exacting requirements.

Diamond Liquid Chlorine is readily available in any convenient quantity including 100 and 150 pound cylinders . . . multi-unit tank cars of 15 one-ton containers and single unit cars containing 16 and 30 tons respectively.

DIAMOND ALKALI CO.
PITTSBURGH, PA. *And Everywhere*

DIAMOND *Liquid* **CHLORINE**

Booklets & Catalogs

Chemicals

A688. American Cyanamid Co., Agricultural Division. March-April *American Hortigraphs & Agronomic Review* contains valuable information on fertilizer uses, from wheat fields to hot beds.

A689. The Barrett Co., Agricultural Development Bureau, Atlanta. "The South's Verdict—A Primer On The American Nitrate of Soda Industry" is an able discussion of history, economics, and human welfare.

A690. Commercial Solvents. March *Alcohol Talks* contains Part 2 of the article, "Crime, Science and Alcohol."

A691. Givaudan-Delawanna, N. Y. City. February *Givaudanian* discusses the use of thymol as a germicidal material.

A692. R. W. Greeff & Co., N. Y. City. Complete list of this company's industrial and pharmaceutical chemicals.

A693. Hercules Powder. February, *The Hercules Mixer*, contains the full list of Paper Makers Chemical Co. products, their characteristics and uses. List is similar to that summarizing Hercules products last month and will appear in a separate booklet by Hercules soon.

A694. The O. Hommel Co., Pittsburgh. *The Ceramic Forum*, March, contains a brief reprint from *The Chemical Age* on "Furnaces for the Vitreous Enameling Industry."

A695. Innis-Speiden. Uses of Locust Bean Gum, Gum Arabic, Gum Karaya, and Gum Tragacanth. A valuable booklet, one of the very few sources available which lists uses of water soluble gums.

A696. Merrimac Chemical. Advantages in the use of "Ferrisul" for water and sewage treatment. Booklet is a brief discussion of industrial water problems for any industry.

A697. Merrimac Chemical. Properties and uses of sodium aluminate discussed in 6-page booklet.

A698. Merrimac Chemical. "Sodium Aluminate for Paper Sizing."

A699. Merrimac Chemical. "Sodium Aluminate in Water Purification."

A700. Milburn Co., Detroit. Chemicals for the treatment of industrial dermatitis, ever-present threat to process industries, are listed in this valuable 4-page booklet.

A701. Monsanto Chemical. *Monsanto Current Events*, February, noteworthy for the fine review of the aluminum industry, written by the Aluminum Ore Co. president. Other worthwhile articles include "Chemical Engineering's Role in America's Future" and "Modern Civilization Necessitates Modern Water," valuable discussion of water purification problems.

A702. Monsanto Chemical. New 56-page booklet lists formulas, specifications, applications, shipping regulations and containers for full list of Monsanto intermediates.

A703. Philadelphia Quartz. March *Silicate P's & Q's* gives a brief resume of silicate use in detergency, using as an example the tremendous daily washing of bottles.

A704. H. H. Rosenthal Co., N. Y. City. New folder on the buying service offered by this supplier of raw materials for soap, insecticide and disinfectant industries.

A705. Schimmel & Co., N. Y. City. "Variations in Commercial Citronellols and The Technical Reasons," by D. K. Bournot. Reprinted from the *American Perfumer*, January, '36.

A706. Schimmel & Co. March *Schimmel Briefs* contains a brief article on "orchid" perfumes.

A707. Wishnick-Tumpeer, N. Y. City. February-March *Witcombings*, interesting notes and items that may discuss company products or just plain, interesting everyday facts.

Monthly Price Lists

A708. Fritzsche Bros. March Price List.

A709. Magnus, Mabee & Reynard. March-April Price List.

A710. Mallinckrodt. March Price List.

A711. Merck. March Price List.

Equipment

A712. The Louis Allis Co., Milwaukee. Engineering and motor application data for "Motors for the Chemical Industry."

A713. Aluminum Co. of America. February *Aluminum News Letter* commemorates the 50th anniversary of the industry with a series of inspiring historical notes taken from the "folk-lore" of aluminum development. The story of the aluminum industry is that of typical American ingenuity and courage, and this month's *News Letter* is at once inspiring and informative.

A714. American Chemical Paint, Ambler, Pa. "Rust-Proofing by the Cromodine Process" is a comprehensive discussion of this recently developed process for rust-proofing steel. Color illustrations show vividly the process in actual operation and use.

A715. The Austin Co., Cleveland. Austin specifications for ultra-modern multi-story or single story plant. Booklet includes comparison of construction costs for both types with consideration of floor space, land space, etc. Light, heat and ventilation factors are also briefly discussed.

A716. Babcock & Wilcox, N. Y. City. New 24-page booklet contains details of design and construction for integral-furnace boiler units.

A717. Buffalo Forge Co., Buffalo, N. Y. Bulletin 501, "Buffalo Type PC Cabinets for Air Conditioning," presents an exceptionally complete survey of uses and specifications for this relatively specialized type equipment.

A718. Chicago Wheel & Mfg. Co., Chicago. List prices for many different types of grinding wheels.

A719. Climax Molybdenum Co. February, *The Moly Matrix*, discusses the service requirements met by Moly steels as sleeves for Morgoil steel mill roll neck bearings.

A720. The Duriron Co., Dayton. February *Duriron Heat Exchanger* contains a brief article on Duriron use in pumps, tube assemblies, heat exchangers, etc.

A721. Electro Metallurgical Co. March *Electromet Review* gives an up-to-the-minute picture of stainless steel use in textile industries. Other new stainless uses are also pictured and described.

A722. Eppenbach, Inc., Long Island City, N. Y. Colloid mills for laboratory or industrial use are listed with full specifications and prices.

A723. H.-B. Instrument Co., Philadelphia. "Blue Book—Part 3, for Science and Industry," lists industrial indicating and recording thermometers. Illustrations, prices and specifications are included.

A724. International Nickel, N. Y. City. "Monel Metal and Nickel in the Manufacture of Pharmaceuticals, Fine Chemicals and Proprietary Products," new Bulletin C-4, discusses advantages, typical uses, corrosion factors and fabricating problems encountered in these fields.

A725. International Nickel. January-February *Nickelsworth*, replete with illustrations and brief descriptions, describes widely varied uses of Monel Metal and rolled nickel, from carburetor to White House kitchen.

A726. Linde Air Products. "How to Bronze-Weld," a summary of available information on bronze-welding and bronze-surfacing. Procedures used to greatest advantage on all the different construction materials commonly welded in this way are briefly discussed.

A727. Linde Air Products. "Improved Fabrication of 18-8 Chromium Steels," an 8-page review of late welding improvements on this widely used construction material. Hints on welding technique are particularly valuable.

A728. Link-Belt, Chicago. Catalog No. 1520. Anti-friction bearing units.

A729. Link-Belt. Booklet No. 1725, "Silverstreak" silent chains drives. Tables show complete details of wheels and chains as well as listing prices, horse power and ratio tables.

A730. N. J. Zinc. February, *The N. J. Zinc Activator*, with articles on "Thermal Conductivity of Rubber Compounds and Compounding Materials" and "The Adhesion of Vulcanized Rubber to Metal" is a valuable booklet for users of rubber-lined equipment.

A731. Patterson Foundry & Machine, East Liverpool, Ohio. Patterson agitating equipment described and illustrated.

A732. Pulmosan Industrial Safety Equipment. Safety hats, designed for coolness when worn as well as protection against falling objects. Booklet describes both hard brim and partial brim models. First designed for miners, the 2 models are now available for general industrial use.

A733. Pulmosan Industrial Safety Equipment. Felt filter respirators, sponge type respirators and paper cartridge respirators.

A734. The Pyrometer Instrument Co., N. Y. City. Bulletin 60 A, new combination surface and needle Pyrometer, said by the company to fill a long felt need in process industries.

A735. Raymond Bros. Impact Pulverizer, Chicago. "Raymond Mills in Review—1935. A Resume of Achievements in Pulverizing and Drying." A fine booklet, worthy of careful reading by every pulverizing equipment user.

A736. John Robertson Co., Brooklyn. March *Robertson Reminders*, brief descriptions and illustrations of some typical Robertson installations.

A737. Shriver & Co., Harrison, N. J. "Shriver Wine Filters" illustrates and discusses typical Shriver installations at various wine plants.

738. Shriver & Co. "Better Plating at Lower Costs with Real Filtration" discusses use of Shriver filters for electroplating solutions.

A739. Shriver & Co. Use of Shriver filters in the production of high quality and large quantity food products is attractively pictured in Bulletin No. 105.

A740. Tennessee Eastman, Kingsport, Tenn. Striking in layout and general appearance, this booklet on "Tenite," new plastic molding material, is even more striking in copy content. Made from Eastman cellulose acetate, this thermoplastic molding material has already found widespread use in many industries. The booklet tells, with word, diagram and picture, the entire story of how "Tenite" is used, how made, and how it should be treated.

A741. The Watson-Standard Co., Pittsburgh. "Plicote, The Armor of Industry," attractive booklet describing properties, applications and advantages of this series of corrosion resistant coatings for metal, wood or concrete.

A742. The Watson-Standard Co. Advantages of "Plicote" corrosion-resistant coatings are discussed in this 4-page folder.

A743. The Western Machinery Co., Wichita, Kans. Catalog Section C-1 lists this firm's laboratory and industrial chemicals. Prices and containers for each product are shown.

Packaging

A744. American Coating Mills, Elkhart, Ind. Folder showing A. C. M. designed and manufactured cartons which have won prizes in recent packaging competitions.

A745. Anchor Cap & Closure. Anchor caps for use in the drug field are attractively pictured in new 4-page folder.

A746. J. L. Ferguson Co., Joliet, Ill. March *Packomatic*, news from plants using Ferguson installations.

A747. General Plastics. February *Durez News* reports vivid picturization of advances in plastics use. From coffee pots to typewriters, plastics are becoming valuable and attractive construction materials.

A748. The N. J. Machine Corp., Hoboken, N. J. Pamphlet describes paper labeling of bottles, cans, plastics, fabrics, and many other materials.

A749. The N. J. Machine Co. Packaging and labeling machinery illustrated in a 4-page folder.

A750. Phoenix Metal Cap Co., Brooklyn, N. Y. March *Phoenix Flame* appears to the hardened reader as the ideal company magazine. Subtitled "a magazine having to do with packaging" the editors have certainly gone far afield in their efforts to make their magazine a joy and delight even to those who care little or nothing about packaging. To see and read this booklet is the only honest way to appreciate it.

Received Late for Classification

A751. Babcock & Wilcox. New 8-page booklet illustrating specific properties of 5 B & W mortars and plastics. Suggested use for each are included.

Chemical Industries,
25 Spruce Street,
New York City.

I would like to receive the following booklets; specify by number: .....

.....

Name .....

Title .....

Company .....

Address .....

All information requested above *must* be given to receive attention.

Chemical Specialties on the Air

NEWSPAPERS, national and trade magazines, direct mail, outdoor advertising, car cards and the radio are the advertising mediums available to the manufacturer of chemical specialties. In what might be termed "the second line of offense" are dealer aids, booklets and catalogs, window and counter displays, etc. Each major or minor medium is a story in itself, as any experienced advertising manager will attest, but the radio, newest of these facilities which have made mass distribution possible and profitable, is certainly less understood than any of the others.

Advancement in Radio Technique

We are less than fifteen years removed from the crystal set and ear-phones. Much of the field of radio is still uncharted, although the past five years have witnessed an amazing advancement. A definite "radio technique" and a personnel who are peculiarly experienced in the subtleties of the "air" have been developed. What then are the present potentialities of the "mike" to increase sales economically for the maker of soaps, cleaners, paints, polishes, packaged fertilizers and the hundred-and-one other specialty items?

Study of Programs

A natural way to find a satisfactory answer is to study what progressive firms are now "on the air," what their programs are, what sales appeals are employed. Next, to appraise the concrete results of either present programs, as far as this is possible, or to investigate the returns obtained in a wide variety of previous programs, preferably, of course, in the fields of the chemical specialties.

Outstanding Programs on the Air

With 621 broadcasting stations, it is impossible within the confines of an article such as this to give the complete roster of chemical specialty manufacturers now on the air. Sufficient for practical purposes will be a presentation of a representative number. Largest of the national systems is, of course, NBC, and at the present time nine specialty companies are active. On the Columbia network, at the present time, the institutional program sponsored by du Pont over 43 stations is outstanding. This program, "Cavalcade of America," is broadcast each Wednesday from 8.00 to 8.30 P. M. Since its purpose is to build good will and awaken interest in the achievement of science, advertising matter is dignified and informative in character. Developments in the field of chemical research are described, particularly as they are interrelated with the chemical industries. A recent mail count shows that "Cavalcade of America" has been receiving more audience letters than all but two other Columbia programs.

Acme White Lead & Color Works has been on the air since 1932. A fifteen-minute program each Sunday from 6.30 to 6.45 P. M., goes over 36 stations, features a single performer, "Smilin' Ed McConnell," who handles the entire broadcast except for the opening and closing announcements. He sings, tells stories, and works the commercials into his patter. At the present time a 10-week contest is being run, at the end of which a total of 220 prizes will have been given away. Each week a first prize of a new Ford Coach, a second prize of $100 in cash, and twenty additional prizes of $5 each, are offered for the best statements telling why listeners like Lin-X, one of the Acme products.

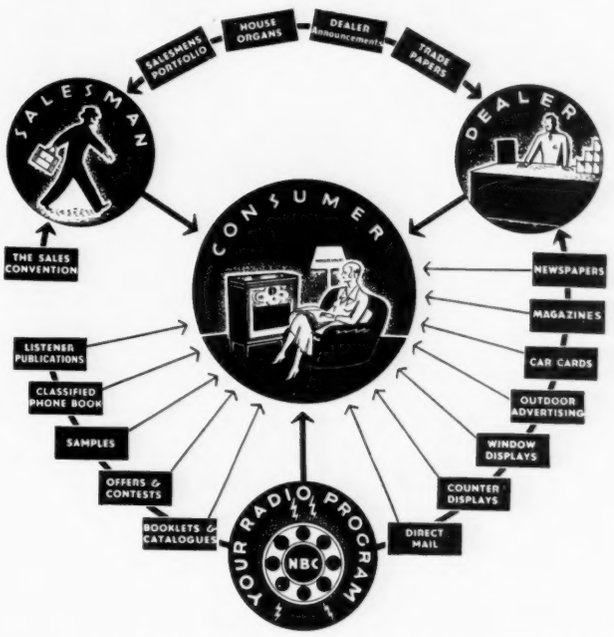


Chart shows the well-balanced advertising program that should be followed for maximum results.

A. S. Boyle Co., makers of Old English Floor Wax, are sponsoring a thirty-minute program, broadcast each Friday from 7.15 to 7.45 P. M., and a rebroadcast to the west from 11.15 to 11.45 P. M. Listed as "Lazy Dan, the Minstrel Man," the program stars Irving Kaufman, who plays supporting parts as well as the title rôle. This program began on the Columbia network March, 1931, and ran for three months. In 1933 it ran for eight months, in 1934 for ten, and in 1935 for twelve. The hookup has been increased from the original 20 stations to 48.

From a number of angles the recently introduced children's program, "The Sunbrite Junior Nurse Corps," sponsored by Swift three evenings a week over eight middle-western Columbia stations is of special interest. This program, educational in character, is at present dramatizing episodes in the life of Florence Nightingale. Before going on the air the scripts are submitted to Angelo Patri, authority on child psychology who sees that no material which might over-stimulate young listeners is broadcast. Dorothy Hart acts as "national president" of the Corps and speaks during each program and another member of the cast, "Aunt Jane," gives simple first-aid instruction. Girls are asked to send in three labels from Sunbrite cans, in return for which they are presented with a membership scroll, a copy of the nurses' creed and an autographed picture of Dorothy Hart and Timothy Bly, boy hero of the program.

"Case Histories" Tell the Story

Again space does not permit giving more than a few representative "case histories" and from a large number three have been selected: S. C. Johnson & Sons' Glo-Coat wax campaign, the experiences of the Climalene Co., a maker of a water softener, and B. T. Babbitt & Co., maker of Bab-O, a scouring powder.

According to John J. Louis, of Needham, Louis & Brorby, Chicago agency handling the Johnson account, the company has been in business for about 50 years, and the company's wax products have been advertised nationally for 40 of these years; that no single advertising effort in the company's history has yielded as definite and direct sales returns as "The House by the Side of the Road," featuring Tony Wons; that never before has it been possible to say with such a degree of certainty that a particular kind of advertising has been responsible for definite sales increases. About 50% of the 1935 advertising appropriation was devoted to radio.

Representative Chemical Specialty Programs Now on the Air

Client	Program Title	Day	Time	Network	Agency
Babbitt, Inc., B. T.	David Harum	Daily except Sat. and Sun.	10.45-11.00 A.M.	Blue	Blackett-Sample-Hummert, Inc. 247 Park Ave., N. Y. City
Climalene Co.	Climalene Carnival	Thurs.	11.30-12.00 Noon	Red	W. S. Hill Co., Inc. 323-4th Ave., Pittsburgh
Jergens Woodbury Sales Corp.	Paul Whiteman's Musical Varieties	Sun.	9.45-10.30 P.M. 11.30-12.15 Mid.	Blue Blue	Lennen & Mitchell, Inc. 17 E. 45th St., N. Y. City.
Moore & Co., Benjamin	Betty Moore	Wed.	11.30-11.45 A.M.	Red	None
Pacific Coast Borax Co.	Death Valley Days Death Valley Days	Thurs. Tues.	9.00-9.30 P.M. 9.00-9.30 P.M. PST	Blue PAC	McCann-Erickson, Inc. 285 Madison Ave., N. Y. City 114 Sansome St., San Francisco
Pittsburgh Plate Glass Co.	Pittsburgh Symphony Orchestra	Thurs.	8.00-8.30 P.M.	Blue	B. B. D. & O., Inc. 383 Madison Ave., N. Y. City
Procter & Gamble Co.: Oxydol	Oxydol's Own Ma Perkins	Daily except Sat. and Sun.	3.15-3.30 P.M.	Red	Blackett-Sample-Hummert, Inc. 221 N. LaSalle St., Chicago
Chipso	Home Sweet Home	Mon. to Fri.	10.15-10.30 A.M.	Red	Blackman Advertising, Inc. 630 Fifth Ave., N. Y. City
Ivory Soap	The O'Neills	Daily except Sat. and Sun.	3.45-4.00 P.M.	Red	Blackman Advertising, Inc. 630 Fifth Ave., N. Y. City
Ivory Soap	Capt. Tim's Adventure Stories	Mon., Wed., Fri.	7.15-7.30 P.M.	Blue	Blackman Advertising, Inc. 630 Fifth Ave., N. Y. City
Camay Soap	Forever Young	Daily except Sat. and Sun.	3.00-3.15 P.M. 4.30-4.45 P.M.	WLW	Pedlar & Ryan, Inc. 250 Park Ave., N. Y. City
Sherwin-Williams Co.	Metropolitan Opera Auditions of the Air	Sun.	3.30-4.00 P.M.	Red	Cecil, Warwick & Cecil, Inc. 230 Park Ave., N. Y. City
Johnson & Sons, Inc., S. C.	House by the Side of the Road	Sun.	5.30-6.00 P.M.	Red	Needham, Louis & Brorby, Inc. Chicago, Ill.
Johnson & Sons, Inc., S. C.	Fibber McGee & Molly	Tues.	10.00-10.30 P.M.	Blue	Needham, Louis & Brorby, Inc. Chicago, Ill.
E. I. du Pont de Nemours & Co.	Cavalcade of America	Wed.	8.00-8.30 P.M.	CBS	B. B. D. & O., Inc. 383 Madison Ave., N. Y. City
Acme White Lead & Color Corp.	"Smilin' Ed McConnell"	Sun.	6.30-6.45 P.M.	CBS	Henri Hurst & McDonald, Inc. 520 N. Mich. Ave., Chicago, Ill.
A. S. Boyle Co.	"Lazy Dan, the Minstrel Man"	Fri.	7.15-7.45 P.M.	CBS	Blackett-Sample-Hummert, Inc. 247 Park Ave., N. Y. City

Edward T. Caswell, advertising manager for Climalene states that one offer on a single program brought 5,811 requests for a full-size package of Climalene and that the cost per radio inquiry was one-half the cost of inquiries received through newspaper advertising.

"Little Miss Bab-O's" Campaign

Arthur Sinsheimer, director of radio for Peck Advertising Agency, says "Little Miss Bab-O's Surprise Party was planned several months before it went on the air. During this time, a separate budget was set up to take care of a well organized territorial advertising and merchandising schedule, strictly devoted to the radio program itself, which was launched about two weeks before the program went on the air. How the jobbers, dealers, salesmen, district managers distributed specially prepared Little Miss Bab-O show cards, pictures, folders, station and time announcements, and announcements of surprise parties of various kinds, is now radio history. I can only say that the audience must have been there on the first broadcast to hear our selling story, if increased sales during that first week can be counted as an answer to our message to try the product. And they're still listening by the same token of increased sales. Merchandising and the broadcasting did it and is still doing it."

The number of successful companies consistently employing broadcasting in their merchandising plans indicate a very definite opportunity for chemical specialty manufacturers, whether they be large or small, to increase sales through the intelligent use of radio. But an important qualification must also be made. It is only the well-planned and well-executed, well-rounded plan that brings definite results. The manufacturer must know specifically what his particular objectives are, otherwise he will be grasping for a red hot poker that will burn badly. The second half of the story, "How to Get into Radio and What Does It Cost," will be dealt with in a later issue.

Soybean Oil in Soap

In spite of the 124 million lbs. of soybean oil used in 1917 in the U. S. for soap making and the 9 million lbs. used for the same purpose in '32, nothing has been published on this subject by our experts. The lathering capacity of soybean oil soap is practically not affected by the hardness of the water, and some coconut and palm kernel oil can be substituted by our domestic soybean oil for soap making purposes. Lathering capacity of soap from soybean oil varies with the degree of hydrogenation. The caustic soda lye used in the saponification of soybean oil should not be over 8.5° Baumé. At a higher concentration of lye a partial saponification combined with a salting out effect takes place. For curd soaps soybean oil should be used only in mixtures with other fats and oils. Soybean oil is very suitable for the manufacture of soft soap, in particular the automobile variety. Since lecithin is a Twitchell catalyst poison, solvent-extracted soybean oil should be freed of the phosphatides before being subjected to hydrolysis by a sulfoaromatic catalyst. "Soybean Oil for Soap Making," by A. A. Horvath, paper delivered before the April A. C. S. meeting at Kansas City.

Termite Questions

Answered by Dr. Thomas E. Snyder

Colonizing adults

IN the next few weeks frightened property owners in various parts of the country will seek advice about termites, for the spring and fall are the seasons of emergence of the insects in the flying stage. What definite knowledge is available of practical value?

First, it is necessary to correct many misconceptions, namely, that termites have been introduced into this country and are spreading from south to north; that they are introduced into buildings in lumber; that they can be killed by insecticides or fumigation, as true ants can; that the disappearance of the winged adults or "flying ants" is an end of the injury to the woodwork of the building and its contents; that ants will protect buildings from termites.

These untruths were disclosed and corrected by Dr. Thomas E. Snyder, Senior Entomologist of the Bureau of Entomology and Plant Quarantine, Department of Agriculture, in an address before the National Association of Exterminators and Fumigators last fall. He showed that termites are native insects. They are not spreading from one section of the country to another, but he pointed out that with the destruction of their natural homes in forest and field, they have been forced to attack buildings because man has disturbed the "Balance of Nature." He also pointed out that 95% of all termite damage in the world is caused by the more common subterranean type, which also causes more serious structural weakening. Detection is easiest at the flying stage, and the point of emergence indicates the approximate location of infested timbers. The presence of branching earth-like shelter tubes of small diameter, constructed by termites of earth mixed with excreted wood on the foundations, is another indication of infestation.

Damage done by termites to a temporary government structure.

Dr. Snyder then outlined the recommended insurance provisions against termite attack: 1. Use no untreated wood in foundations, basements, or cellars. 2. Use cement mortar in masonry foundations. 3. All masonry foundations to be capped with concrete or mortar and slate. 4. Place metal mechanical barriers over foundations. 5. Proper ventilation and screening of all ventilation openings and doors.

After infestation, the recommended procedure of the Government is to substitute timber impregnated with coal tar creosote where used in contact with the ground, and where used above ground and finished or painted after treatment, it should be impregnated with zinc chloride. The speaker mentioned the possible use of soil poisons, and stated that their use where reconstruction is impossible, appears to be a promising solution, but insisted that the use of coal tar creosote, either in full strength or diluted in petroleum oils, orthodichlorbenzene, or other suggested soil poisons, was still in the experimental stage. Finally, Dr. Snyder endorsed the use of metal shields.

Dr. Snyder, at the end of his formal paper, was plied with questions by those working commercially on termites:

Question: You say, Doctor, that wood that has been impregnated with creosote will not be attacked?

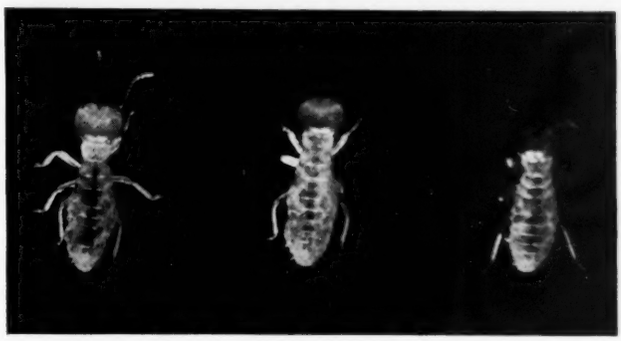
DR. SNYDER: We have had records over the last 50 years of timbers impregnated with coal tar creosote. After 30 years there was a small percentage, not a large percentage, due to improper penetration, deterioration of the chemical, or some other cause. This percentage will be rather small if the creosote is standard grade and the work has been thoroughly done.

Question: What particular method do you recommend of soil treatment, or timber treatment?

DR. SNYDER: We recommend coal tar creosote. These recommendations are all in our literature which I have here before me, but we may change these soil recommendations at any time. We hope to get a soil poison which will be odorless and which will be non-toxic to people. We think we have a few very good leads. We have one chemical which builds up crystals rapidly in the ground. We have another that has no odor to it, and we have another which is extremely toxic. But our soil poison recommendations are provisional.

Question: Your map shows termites in Milwaukee; that is, you have included Wisconsin. How is it we don't get any complaints?

DR. SNYDER: I told you that the further north you get in Wisconsin and Michigan the slimmer the termite population is.



Termite workers.

All photographs courtesy U. S. Bureau of Entomology and Plant Quarantine, Dept. Agriculture.

We have had very, very few records in Wisconsin, one or two cases in 20 years.

In response to a rather general question asking information about termites in other countries, Dr. Snyder made the following highly instructive statement: There is some reason why there are blank areas in the distribution of termites, and some reason why termites will stop when there is still abundant food supply and conditions apparently the same. These causes might not be detected by man. We are still investigating them. We know that termites have diseases which wipe them out, but usually you will find some traces, the heads and jaws of workers are left, but apparently in these cases I have mentioned they have just simply disappeared. They are not there, that is all. We cannot explain these cases.

Question: Doctor, in speaking of the shields, what material do you recommend?

DR. SNYDER: Any non-corroding metal such as zinc, copper, corrugated iron. Don't use tin.

Swarm of adult termites.

Question: You mentioned the use of microphones in detecting termite activity. What practical import has that?

DR. SNYDER: They have developed outfits by which you can hear a termite walk, but these are heavy and expensive. So far we have no stethoscopes suitable for field use in the case of termite control. I don't believe it would be practical to use anything we have as yet.

Question: Is there any relation between termite infestation and public health?

DR. SNYDER: None whatever.

Question: Is seasoned heartwood lumber more resistant to termites than the new growth of wood we are getting?

DR. SNYDER: We don't recommend any wood as termite immune, not any commercial wood from anywhere in the world, but there are commercial species in this country, close grained heartwood, cypress, redwood, long leaf pine which are termite resistant. But we still think wood impregnated with chemical wood preservers is much better. We don't recommend any termite resistant woods for use in contact with soil, only above ground. . . . .We specify to use the best grade of lumber possible. We are trying to get lumber companies to grade timber. . . . .

At this point the discussion turned to termite colonies and finally to the belief that if the queen ant is destroyed the colony will die. Such belief Dr. Snyder termed as ridiculous, stating that if you should destroy the king and queen there are hundreds of others to take their place.

Question: Are we to assume that termites have reached their saturation point in the northern states or shall we look for increase in infestation?

DR. SNYDER: There will probably be slight increases in damage because, as I say, there is a disturbance of the balance of nature.

Question: How long approximately would it take for a properly constructed building to become so infested as to be dangerous?

DR. SNYDER: In the continental U. S. very few buildings have actually collapsed due to termite infestation alone. When you get decay, and subterranean termites, and poor construction, and all working together, sometimes there is a collapse but this will take a very long time.

Question: Why do I find termites in buildings that have concrete steps and concrete porches . . . .?

DR. SNYDER: Sometimes concrete is put right on wooden forms and left there. Another reason is that the forms are left on the outside of the concrete work and still a third reason is that they fill in with dirt or wood debris underneath.

Question: You mentioned various resistant woods. Wouldn't it be a good idea to restore artificially and dry out wood and seasoned timbers that have been in buildings for years to assist in the repelling and prevention of termites from coming in?

DR. SNYDER: It would be rather difficult to put this resistant principle or extractive in wood already in place but we have experiments going on now with about 30 different pine oil compounds with which to impregnate wood before being placed in the building.

Question: Do you approve of what is commonly referred to as spot treatment where only a small section of the basement is infested, or do you unqualifiedly recommend the entire basement be treated?

DR. SNYDER: Our recommendations are based entirely on structural changes. Where these are impracticable we recommend soil poisoning. If the damage is localized and the people haven't the money for a complete job, we recommend localized treatment.

Question: You mentioned in a poor foundation wall, poor concrete, termites can go through it physically and chemically, what did you mean by chemically?

DR. SNYDER: They have a secretion which acts on certain mortars. They also penetrate physically and disintegrate just the same as the wasp can.

Question: Why does the state of Louisiana refuse to issue a license to a person, or to even recognize a concern that does, in any way, shape or form a part treatment?

DR. SNYDER: We wouldn't recommend it in general either.

In closing in response to a statement by one of the members on methods of creosoting Dr. Snyder stated: There are three or four methods of impregnating lumber. The best treatment is the cylinder pressure. The deeper, the more thorough the penetration, the better the treatment.

Clear, Water-White Lacquer

A clear, water-white lacquer for rubber footwear and other rubber products has been developed and tested by Stanley Chemical Co., East Berlin, Conn. Material is so white that it can be applied over white stock before or after cure without discoloring the rubber and will not discolor in the cure. The lacquer having these qualities, will not change the color of black or brown rubber. It also has the ability actually to stretch. A film of this lacquer can be stretched on rubber fully 200% and, when released, will come back gradually to its original length. This lacquer has an excellent feel on rubber and has extreme durability, adhesion, and flexibility. *India Rubber World*, Mar. 1, '36, p61.

Interior Stone Cleansers

By Charles F. Mason, Ph.D.

ALTHOUGH recent trends in interior finishing of buildings lean toward the introduction of more metal and artificial compositions like terrazzo, stucco, etc., highly polished natural stone panels remain in the older buildings and are still being introduced to some extent in the newer ones. The care and maintenance of such surfaces are usually entrusted to incompetent employees who mar the surface with improper polishes, and then make frantic efforts to restore the original lustre with hand applied compounds.

Adhering foreign materials consisting of grease and dust are wiped off with harsh dry clothes instead of being washed with at least a soap; such errors being committed upon the supposition that the surface is too hard to be marred. Bear in mind that such surfaces need only proper cleansing to remove foreign material and restore the lustre, and that they cannot be repolished satisfactorily with strong chemicals and hand buffing. This differs widely from metals where a tarnish can be removed with mild mechanical action and a compound to produce a new glossy surface; from furniture where a new protective coating can be applied easily with a brush and revived from time to time with an oil; and from floors which can be smoothed with sand paper, coated with varnish and wax.

Source of Stones

To appreciate the nature of such a surface, a brief description of the source of such stones and the mechanical energy expended to produce a polish is submitted herewith. The original quarry stock is chiselled out mechanically without the use of explosives and is examined carefully to detect natural fissures before further work is done to cut it into the desired sizes. The softer grades are sawed into geometrical forms by steel saws aided by a slurry of abrasive which is kept in constant circulation. Those which are too hard for such an operation are shaped by pneumatically operated chisels to an approximately smooth surface after which they are subjected to the polishing operation.

It is brought into contact with a mechanically driven iron cylinder over which a slurry of silica sand or other abrasive is circulated and the operation is continued until the entire surface is even, whereupon the abrasive and cylinder are changed to another with milder abrasives and after a succession of at least three the surface is smooth enough for the final polishing operation. This consists of the cylinder which is rotating as usual but one which is wrapped with heavy canvas or felt and is lubricated with the mildest abrasive which is termed a putty. This consists usually of precipitated aluminum oxide, chalk or an earth mixed with a weak organic acid like oxalic.

Defective Cleaning Compounds

Although the surface has by progressive stages been approximating ideal smoothness which will reflect light, it is strange to relate that little mirror effect can be noticed until after the putty has been applied. Hence it is obvious that such a surface upon different classes of stone ranging from the hardest granites to the softest limestone marbles should retain its beauty for many years where it is not exposed to the elements. However, they do not, and although many theories have been advanced the trouble can be attributed largely to defective cleaning compounds, twelve of which are listed opposite.

In the light of recent investigations upon the rate of solution of stone in acid solutions and upon penetration tests by The U. S. Bureau of Standards, none of the above compounds could be safely marketed for general use upon polished stone surfaces. It has been shown that salts like sodium carbonate and bicarbonate, phosphate, chloride, sulfate and magnesium sulfate and ammonium carbonate penetrate and upon subsequent crystallization mar the polish. Moreover, the rate of solution by acids passes through a maximum with increasing concentration and in the case of hydrochloric a solution containing 7.40 per cent. reacts at the same rate as one of 37 per cent. acid.

No. 1. Water 34 lbs.; Flour 30; Salt 8; Borax Soap 8; Soda Ash 4; Borax 8; Ammonia (Conc.) 8.

No. 2. Oxalic Acid 2 lbs.; Water 5; French Chalk 37; Hydrochloric Acid (Sp. G. 1.20); Sulfuric Acid (Sp. G. 1.20) 19.

No. 3. Borax Soap 4 lbs; Soap Stock 8; Soda Ash 8; Water 10; Borax 4; Ammonia (Conc.) 2; Volcanic Ash 64.

No. 4. Linseed Oil (raw) 25 lbs.; Malt Vinegar 25; Turpentine 25; Alcohol 25.

No. 5. Feldspar 80 lbs.; Soda Ash 20.

No. 6. Pearl Ash 5 lbs.; Black Ash 5 lbs.; Water 90 lbs. (boiled).

No. 7. Oxalic Acid 12 lbs.; Carbolic Acid 1; Water 87.

No. 8. Ammonium Fluoride 75 lbs.; Oxalic Acid 10; Soda Ash 15 (1.5 lbs. per gallon of water).

No. 9. Hydrochloric Acid (conc.) 87 lbs.; Water 9; Salt 4.

No. 10. Volcanic Ash 53 lbs.; Talc (Soapstone) 27; Soda Ash 4; Tri-sodium phosphate 16.

No. 11. Sodium Bisulfate 25 lbs.; Sodium Sulfate 75.

No. 12. Sulfuric Acid (Sp. G. 1.20) 9 lbs.; Diatomaceous Earth 3; Sodium Sulfate 88.

However, these and modifications are symbolic of what are sold to-day. Instances of chemicals which are dangerous to be placed at the disposal of the average worker are ammonium fluoride in the presence of oxalic acid, strong acids in high concentration like hydrochloric and sulfuric, carbolic acid, and corrosive alkalies like caustic potash which is derived from the pearl and black ash of formula 6. They would not only be injurious to the hands and applicator but would destroy varnish, paint and lacquer films which they might accidentally contact. Linseed oil, turpentine and malt vinegar in combination would be absorbed and upon subsequent oxidation would darken the color of white marble by formation of interior locked resins.

Nos. 1 and 3 approximate satisfactory cleaners and would be safer if the salts were eliminated and a mild abrasive with a non-oxidizing mineral oil were substituted. In view of present practices in the trade, that of selling these mixtures in powder form in cardboard boxes, a satisfactory cleaner can contain an oil absorbed by the abrasive and other harmless components which are of such a nature that the oil emulsifies at once upon moistening at the point of use. There are many combinations which will meet this specification, one of which is listed below.

Abrasive (volcanic ash, Celite, or other earth)	70 lbs.
Soap powder	10 lbs.
Oxalic acid	2 lbs.
Water soluble gum	8 lbs.
Mineral oil (heavy white)	10 lbs.

This should be mixed thoroughly by mechanical means whereby a rubbing or scraping action is exerted to break lumps which are sure to form when the oil is absorbed by the abrasive, and to avoid local points where high concentrations of oil might still remain and soak through the package. Otherwise this is one cleaner which will not harm polished stone surfaces, and instead of attempting to clean and polish it will only do the former.

"Chemical Specialties" insert cover this month shows "Lazy Dan, the Minstrel Man," as portrayed by Irving Kaufman over the Columbia network, sponsored by A. S. Boyle Co.

Household Specialties

The Month's New Specialties

Among the month's new chemical specialties of more than passing interest is "Adhesol" a solvent preparation that makes the removal of adhesive tape simple and painless. It is a product of the Adhesol Co., Buffalo, N. Y. Other products reported: Glenz-2-Gleen is a household cleaner manufactured by Rieck & Johnson, Tyler, Texas; Kendall Mills, Walpole, Mass., maker of Curity cheesecloth, announces Rymplecloth, a polishing, cleaning and dusting fabric; The Chieftain Mfg. Co., Baltimore, is manufacturing its Color Shine white shoe cleaner and black shoe polish according to improved formulas; A laxative jelly for dogs, cats and other fur-bearing animals is tubed by Tested Specialties Company, Chicago, and called Nose-Lax. Dab it on the animal's nose, and he will instinctively lick it off; Colgate-Palmolive-Peet adds to its line of white perfumed toilet soaps 2 more, named Violet and Carnation. These 2 bring the line up to 12.

Universal Pharmaceuticals, Inc., 450 Seventh ave., N. Y. City, has begun distribution of B-99, an industrial germicide, and of B-9, an antiseptic and germicide to be sold to consumers. L. H. Cooper, recently with Cooper-Vossler, Inc., N. Y. City, president of the new company, will direct advertising.

Neva-Wet Bottling Corp. has secured from the Neva-Wet Corp. of America, of which S. Howard Lefkowitz is president, the exclusive bottling, merchandising and sale rights to a spot-resistant and water repellent liquid for wearing apparel and other articles, which will be distributed through Lehn & Fink, Inc.

Additional Trade-Mark Legislation

Constant popping-up of bills to protect trade-marks in various State Legislatures throughout the country is becoming a source of worry. After such proposals had been killed in Nevada, Maryland, N. J. and N. Y., another bill has been introduced in the Rhode Island Senate, requiring mandatory registration of trade-marks.

Chlorinated Naphthalenes for Dry Rot

Chlorinated naphthalenes (liquid mixture) have been used in Germany for several years as dry-rot preventatives. They were introduced by the Consolidirte Akaliwerke of Westeregeln and sold under the tradename "Xylamon." Chlorinated naphthalenes are produced in the U. S. Dr. H. Ramstetter of the above mentioned company reports steadily increasing application in Germany. Material, according to this authority, not only prevents the incidence of dry rot, but successfully cures timber that has already been attacked. Advantages of the product are claimed to lie in a number of its properties. Its low surface tension allows efficient wetting of the wood surface and comparatively deep penetration. Its complete insolubility in water and its comparatively high density (1.25) prevent it being leached out, and it can consequently be applied to wood which is immersed in water. Its comparatively low-vapor pressure means a very gradual evaporation and a slow penetration of the wood. It is stated that when the material has been applied to woodwork in constructed buildings, its odor has not been found a very marked drawback, even in buildings where the ventilation is not highly efficient. In concentrations at which its odor is absolutely unapparent to the human nose it still exerts its effect, not only against dry rot but even against such insects as cockroaches, bugs and flies, and even against mice. *Chemiker Zeitung*, Feb. 26th.

Labeling Pyrethrins Products

The Division of Chemistry of the California State Dept. of Agriculture, Dr. Alvin J. Cox, chief of the division, held a meeting in San Francisco on Apr. 6th, to discuss the problems relating to the labeling of rotenone and pyrethrins products. Manufacturers were invited to send a representative to the meeting.

Notes of the Specialty Companies

Etchall, Inc., is successor to Pine Consolidated Corp., which brought out "Etchall" an etching cream which may be used without danger of injurious effects to hands or clothing. Dumont Clarke, formerly with American Oil, is president of the new company. Offices have been established at 24 E. 22nd st., N. Y. City.

H. R. King of R. J. Prentiss & Co. of 100 Gold st., N. Y. City, reports that much time is being given at their St. Louis Laboratories to developing a concentrate for work on bed bugs and roaches.

"Right Now . . Get Rid of Garbage Smell . . Guard Against Germs This Easy Way." Gold Dust was thus advertised last month for the attention of harassed New Yorkers inconvenienced by the elevator and service strike. C. N., West Disinfecting's product, was also tied to the strike in copy calling attention to the necessity for guarding against germs.

The L. E. Scott Co., of Southington, Conn., manufacturers of Lesco, has been sold by the Scott family to James Smail, president of the Detectalite Co. of Warren, R. I. Business which has been in Southington for many years will be moved to Warren, R. I., by its new owner.

Durham Wax, 203 School st., Des Moines, Iowa, is adding liquid wax, water wax and water putty to its line.

Sunshine Chemical, N. Y. City, will operate a branch factory for the manufacture of metal polish and insecticides in Miami, W. H. Ellert, vice-president, reports.

Buffalo Exterminators Organize

For the past few years there has been a desire to form a local association of Exterminators and Fumigators in Buffalo. An organization meeting took place Mar. 9th at which there were present the following: Messrs. McLeod of the McLeod Exterminating Co.; Bundt of the Safe Way Exterminating Co.; Pickardt of the International Fumigating Co.; Nolan of the Aborn Fumigating Co. and Lewis of the Rose Exterminator Co. Election of officers resulted in Harry S. Lewis being chosen president and K. C. McLeod secretary. A 2nd meeting was held Mar. 23rd.

Not only has a better understanding been brought about among the men organized into this group but activities have already been started whereby a constructive program is under way. Here again there is that determination to cooperate with the National Association of Exterminators and Fumigators with enthusiasm running high to attend the Cleveland convention 100% strong.

Personnel Items

R. H. Hobbs, export manager of Enoch Morgan's Sons Co. (Sapolio), left Mar. 28 for an extended trip through South America. He will spend a month in the company's Buenos Aires office, supervising merchandising and advertising activities and will also visit Sapolio distributers in Peru, Chile and Brazil.

W. C. House has been appointed advertising manager of Larvex, Annette's Perfect Cleanser and Zonite Sales. Mr. House was formerly connected with several large advertising agencies in N. Y. City.

PWA Rat Extermination Operations

Exterminators are aroused over the activity of the PWA in performing rat extermination jobs on private properties, and many of the leaders in the field are discussing methods of combating this entrance of governmental agencies into direct competition with private enterprise.

Cuban Polish Markets Analyzed

A good market exists in Cuba for furniture polishes and while domestic manufacturers supply from 30 to 40% of the requirements, American products furnish a large volume of the imports. In '35, exports of furniture polish from the U. S. to Cuba amounted to 42,346 lbs., valued at $6,672. There are a number of American brands of polish on the market and distribution is principally through dealers in hardware and automobile supplies. Containers most popular in the trade for furniture polishes are bottles of from 4 to 12 oz. Liquid rather than wax polish is apparently preferred and in some cases imports are made in bulk and bottled in Cuba by domestic distributors in order to reduce transportation charges and duty. Report by Consul Harold S. Tewell, Havana.

Nonflammable Pyrethrum Spray Formula

Chemical specialty manufacturers will be interested in a new booklet, "A Nonflammable Pyrethrum Spray For Use in Airplanes," by C. L. Williams, senior surgeon, and W. C. Dreesen, past assistant surgeon, U. S. Public Health Service, Reprint No. 1709, Public Health Reports, obtainable from the Supt. of Documents, Washington, D. C., 5c a copy. It is briefly summarized as follows: A mixture of 1 part pyrethrum extract in kerosene (containing 2 per cent. pyrethrins) and 4 parts carbon tetrachloride (containing no pyrethrins) has been made up and at the present writing has been tested in one experiment in which 5 cc. per 1,000 cubic ft., with 5 minutes' exposure, killed 100% of exposed *Aëdes aegypti* (50 males, 24 females). In view of the fact that the pyrethrum content of the mixture was not over 0.4%, this result was unexpected and surprising. By ordinary tests this mixture is nonflammable. Since this report was written, 3 additional tests have been made with this mixture, in all of which 100% of the mosquitoes were killed by 5 minutes' exposure. Furthermore, it is found that a kerosene extract containing 0.4% of pyrethrins is about as effective against *Aëdes aegypti* as is one containing 2% of pyrethrins.

Specialty Companies' Advertising Programs

Rinso newspaper advertising in 34 key cities throughout the country is being devoted for the 1st time to publicizing and explaining the significance of the new all-guard guaranteed washable tag, used to identify many cotton and linen fabrics. Such fabrics are guaranteed by converters to be of excellent quality, fast color, sanforized-shrunk and Rinso wash-tested. These tags identify piece goods, drapery fabrics, women's, misses' and children's ready-to-wear. Continuity strips of 420 lines each will be used in these papers, with a circulation of more than 6,400,000.

P. & G. is offering $2,500 in prizes in the 12th annual soap sculpture competition being conducted by the National Soap Sculpture Committee, 80 E. 11th st., N. Y. City. Committee plans to exhibit 100 of the best soap sculptures in New York, Chicago, Philadelphia and other leading cities.

P. & G. has tied up with the seasonal interest in gardening with a "garden-lovers" offer in early spring issues of magazines.

A 200-line advertisement points out that "lava soap is the gentle pumice soap that gets the grimiest dirt quickly yet is safe for the tenderest skin." Soap company offers $2.60 worth of annual flower seeds from The Wayside Gardens Co., Mentor, O., for 25c and one Lava soap carton.

Advertising in connection with the Palmolive soap (Colgate-Palmolive-Peet) letter writing contest, featuring 20 free trips to Europe, which began nationally last month, will be continued until June 15. Three national publications, as well as 39 Sunday newspapers, will be used. In addition to awarding the 20 free trips on the new liner *Queen Mary*, 100,000 additional prizes will be presented to the writers of the best letters. Each dealer whose customer wins a major prize will receive $250, while the clerks who make the sales will get $100 each.

An intensive advertising campaign to run through the year has been launched in newspapers of 11 cities by the J. L. Prescott Co., makers of Oxol. Broadside presenting the campaign to dealers is entitled "Hurry Call for Bigger Profits."

Manhattan Soap, maker of Sweetheart Soap and Sweetheart Flakes, plans to extend its advertising campaign (reported in March C. I.), at present confined to N. Y. City and vicinity, to N. Y. State, Ohio, Michigan, Chicago, Kansas City, Baltimore and Washington.

Merck & Co. will run a campaign in one and 2 column space in April and May issues of 4 women's magazines, for Di-chloricide, a moth killer.

Colgate-Palmolive-Peet, in conjunction with 5 other manufacturers of soap, beverage and food products, distributed 15,000,000 8-page premium circulars from house to house in states from Maine to Texas during March. Printing and distribution of the circulars, consisting of 4 color and 4 monotone pages, are described as the biggest job of its kind. Colgate's Octagon soap products and Kirkman's soap products were featured.

Returning to comic pages after 4 years, S. C. Johnson & Son, Inc., Racine, Wis., will run weekly insertions in continuity strip form in 87 newspapers for Johnson's wax and Glo-Coat floor polish. Monday evening network series continues.

P. & G. has launched a nation-wide contest on Camay soap in 225 newspapers, in several Sunday magazine sections and on the Camay radio program. A total of $103,000 in prizes will be distributed, with the country divided into 5 contest zones. First prize is $3,000 in cash, with the next 1,470 prizes comprising radio sets valued at $100,000. Entrants to the contest have only to finish this sentence: "Camay is my beauty soap because—" Each entry must be accompanied by 3 wrappers.

The Britt Chemical Co., Milwaukee, has appointed Gale and Pietsch, Inc., Chicago, advertising agency to handle its account. Company manufacturers powdered ammonia, bluing, water softener and other household products.

Industrial Specialties

Soap and Water in Dry Cleaning Baths

Use of soap and of water in the dry cleaning bath was the subject of much discussion—and some disagreement—at a recent meeting of the London Section of the Society of Dyers and Colourists. Matter was raised in the first place by C. L. Bird in a talk entitled "Notes on Dry Cleaning." His address was divided into 3 parts. First of all he dealt with the addition of soap to the dry cleaning solvent, outlining in chronological order the patent and other literature and describing the work which had been done by R. B. Brown and also by himself.

Function of dry cleaning soaps, as used in the bath, had, he said, long been a matter of conjecture, various suggestions having been put forward to explain why better results were obtained when they were present. Little had been done in the way of actual investigation of dry cleaning soaps and their functions prior to his own work. R. B. Brown had carried out dry cleaning investigations for the National Federation of Dyers and Cleaners, using white spirit as solvent, and among his conclusions were that the goods should not be completely dried before cleaning, or should be allowed to regain their moisture

from the atmosphere; that the maximum cleaning effect took place in 25-30 minutes at 25-30° C.; that the best soap to use is a potash soap in which 5 to 10% fatty acid is unsaponified; that the use of ammonia is not to be recommended. Work on similar lines had been carried out in America and confirmed that white spirit plus soap gave better cleaning than carbon tetrachloride or trichlorethylene without soap.

Mr. Bird proceeded to review his own work and stated that in removing dirt, lab. soap no. 3 was very efficient at low concentrations, reaching a maximum at ½%, but was less efficient at higher concentrations. Mr. Brown had mentioned ¼%. It was a point on which practical dry cleaners would probably differ and he would not care to say who was right.

Summarizing his studies on the function of soap in the dry cleaning bath Mr. Bird said that soap formed adsorption compounds with dirt and would keep pigments in suspension for long period. So far as he could see its sole duty in dry cleaning was to break up the adsorption compound fabric-dirt and to prevent dirt from settling back on the goods. It seemed as though the action of the machine and the solvent did most of the cleaning and the soap ensured that there was no redisposition. Mr. Bird gave a formula to indicate the action of the soap:

fabric-dirt + dry cleaning soap ⇄
dirt + dirt-dry-cleaning soap +
fabric-dry cleaning soap.

The 2nd part of Mr. Bird's paper was of a more general nature, but called attention particularly to the use of water in dry cleaning. A process combining the advantages of wet cleaning with those of dry cleaning without their disadvantages had been the philosopher's stone of dry cleaners. Several proposals had been made for addition of water to the dry cleaning bath and the Sanitone process in which mahogany sulfonates were used (B.P. 392,931) had aroused much interest. Mahogany sulfonates were used as carriers of water and appeared to have no affinity for textiles. In certain cases, such as those of suits and grey flannels, it was possible to use less elaborate methods of adding water. After ten minutes cleaning using a centrifuge or filter press 1 to 2 pints of water could be trickled in slowly. One could not add water in this way to, say, colored silks, but a more concentrated solution of dry cleaning soap could be used than was usually the case.

Mr. Bird concluded with a few comments on non-flammable solvents. He expressed the view that eventually the chlorohydrocarbons might be used for the greater part of dry cleaning and white spirit used only to a minor degree.

F. G. Newbury said he would throw a bombshell at the lecturer. Had Mr. Bird any real evidence that the addition of soap to the dry cleaning bath was of any value at all? Was it not the water introduced that was of value? They did not use soap at all and there was no difference.

Mr. Bird replied that tests did show that there was a definite improvement when soap was used. Admittedly, with a process using a filter press there was not the same need for soap, but even so there was an improvement.

F. W. Walker raised the question of shrinkage in connection with additions of water. Mr. Bird said there was not much shrinkage with the mahogany sulfonate process. Mr. Newbury agreed, and went on to repeat that soap was of no value. As many as 80% of dark suits were passed after cleaning when water was used and no soap. Water had to be used very carefully, of course, but it was of value.

W. Brown thought the problem was to find a solvent which would remove water stains and grease. He thought the sulfonated fatty alcohols required investigation in this connection.

Mr. Newbury observed that if dirt was removed very rapidly from the solvent there was no need of soap, but conceded that if this was not so then soap might be of value in preventing the dirt from getting back on to the goods. *The Dyer & Textile Printer*, British, Feb. 28, '36, p216.

Soap Fats from Coal

Fatty acids suitable for soap-making will be produced at a German factory at Witten, in the Ruhr, from coal. Factory is operated by the Deutsche Fettsäure Werke G.m.b.H., which has been founded jointly by the Märkische Seifenindustrie of Witten and the Henkel Co. of Dusseldorf.

The editor of the British *Chemical Trade Journal* comments as follows: "In the absence of further details, it is uncertain whether the synthetic carboxylic acids referred to are obtained by the direct oxidation of coal or by the oxidation of hydrocarbon products of coal distillation. A good deal of work has been carried out in America, Russia and Germany, on the production of synthetic fatty acids from petroleum oils; but little, so far as we know, has been published on the utilization of coal and coal oils for this purpose.

Notes on Industrial Specialty Companies

Eaton Manufacturing, Houston, Texas, distributer of chemical laundry supplies, is taking over a larger building at 1201 Holly st.

Valentine & Co., Valspar paints, varnishes and enamels, is breaking in April an intensive drive, making consistent use of color and featuring the boiling water test. Valentine in past years was one of the paint industry's largest advertisers.

Montgomery Builds New Plant

H. A. Montgomery Co., Detroit, manufacturer of a complete line of highly specialized oil and chemical products for the metal-working trades, will erect a $250,000 oil refinery at Blue Pidgeon, Findlay, Ohio, where lubricating oils and chemical specialties will be produced.

New St. Louis Laundry Supply House

The G. R. Schmidt Co. of St. Louis, recently organized to distribute chemicals for dry cleaning and laundry, bottlers and institutional supplies, has leased 6,000 sq. ft. in the Hellrung-Grim Bldg.

Merchandising Specialties

How to Pick a New Product

Every company, sooner or later, is confronted with the problem of putting out a new product. The older the company is, and the more successful it has been, the more insistent this problem becomes.

In essence, the problem of finding the right product to add to the line is as follows: 1st, learning the market, and 2nd, being able to create something which will satisfy its needs. Failure on either of these counts means a loss of money, momentum, and goodwill. To put out a product which is not ready for production is worse than sticking to the old line, no matter how behind the times it may be. To put out a product which does not meet the market demand is much the same thing as continuing to put out the obsolete product.

A broad view of the eligible articles to be taken on should be planned. These should be listed in some systematic manner, omitting, of course, those which are excluded as unsuitable. By so listing them it is fairly easy to group them in the order of their eligibility. In this way the process of elimination can be put into effect.

Having finally determined, by elimination, upon the product which seems best fitted to the purposes in hand, it becomes necessary to study the market for sales possibilities. Cost figures must also be examined, so that the tentative designs thus far developed should take whatever form is most certain of success.

In the final perfecting of the products designed it is often desirable to make certain radical improvements and changes over anything on the market at the moment, in order to be well

ahead of the field. When putting out an entirely new product, one is not hampered by the fact that tools and equipment, not to speak of catalogues and sales material, can be scrapped only at high cost. It is just about as easy to put out a thoroughly modern device as one which has been preserved only because it is cheaper to produce than something more refined. "When You Decide to Manufacture a New Product," by Byron Moore, *Market Research*, February '36.

Enlarged Field for Flame-proofing Materials

Chemical specialty manufacturers might well investigate the market for flame-proofing or flame-retarding chemicals. Undoubtedly the recent fire in a Chinese restaurant in N. Y. City, which caused the death of 10 persons, will give impetus to municipal legislation requiring treatment of inflammable materials on a greater scale.

Consider the Re-Use Container

A food company in St. Louis is packing 5 foods in a corrugated box that folds into a toy grocery store. Many associated household chemical specialties could be packaged similarly.

Several of the food companies are using the appeal of containers that can be used about the house after being emptied. One of the best-known cheese makers has built up sales volume with a container that finally becomes a drinking glass. In the February issue of CHEMICAL INDUSTRIES in the New Packages Section, p179, was shown the container used by a Massachusetts silver polish manufacturer which can be used later as a container for cigarettes. The sales appeal of containers that can be used by the purchaser after they have served their original purpose is great, providing variation is given so that the buyer does not turn from a particular product because he or she has accumulated a sufficient number of such articles. Chemical specialty manufacturers have been rather backward in adopting this method of increasing sales. But there are dangers to be guarded against and which should be thoroughly understood before launching a campaign with such types of containers.

Agricultural Specialties

Virginia Considers Fertilizer Bill

Virginia legislature has under consideration a new bill covering the manufacture and sale of fertilizers in the state. As it passed the House of Delegates principal changes from the present law are as follows: Minimum guarantee of plant food is raised from 11% to 14%; if nitrate nitrogen is claimed, the amount thereof must be guaranteed; water insoluble nitrogen is to be guaranteed in place of the present water soluble nitrogen; in the case of mixed fertilizer branded for tobacco, the maximum amount of chlorine must be stated; application for registration must state whether a fertilizer is acid-forming or non-acid forming, and a tolerance of 50 lbs. per ton in terms of calcium carbonate will be allowed; source tags are eliminated as such, but the tag specifying the percentage of mineral and organic nitrogen is retained; penalties are provided for failure to maintain the new guarantees. Bill is now before the Virginia Senate.

Brazilian Calcium Arsenate Markets

Calcium arsenate manufacturers interested in the Brazilian market may obtain a detailed report made by Assistant Trade Commissioner Aldene A. Barrington, Rio de Janeiro, from the Chemical Division, Bureau of Foreign & Domestic Commerce, Washington.

Chemicals for White Pine Blister Rot

Chemical killers now supplement hand destruction of currant and gooseberry bushes in the Government's fight on white pine blister rust in the western uplands where the bushes are so large that the hand method is impractical. Bureau of Entomology and Plant Quarantine, Dept. of Agriculture, recently perfected an easy, effective, and comparatively cheap method for using Diesel oil, ammonium thiocyanate, or sodium fluoride to destroy wild currant and gooseberry bushes, which harbor blister rust spores, in valuable wooded areas. Eradication crews still get rid of most of the dangerous shrubs and plants by up-rooting and grubbing. They resort to the new method only when they find it too difficult to uproot the plants. In using the chemicals, workers 1st cut off the bush at or below the ground. Then they apply small quantities of the proper chemical to the mutilated stump. A liquid chemical, carried in a canteen slung over the worker's shoulder, is applied with a syringe which fits as a stopper to the canteen. Syringe squirts out about 1 fluid oz. with each stroke. Or a solid chemical, in paper packages, one dose to a package, may be sprinkled over the stump. Workers carry these packages in cartridge belts. Kind of chemical used in each case depends on the species of plant to be treated and on the kind of soil. For example, 2 to 3 fluid ounces of Diesel oil or of a saturated solution of ammonium thiocyanate gives best results on the Sierra gooseberry (*R. roezli*) of California, usually found on very dry ground; and from 2 to 3 oz. of dry ammonium thiocyanate or of sodium fluoride is effective on the sticky currant (*R. viscosissimum*) of Idaho, growing on slightly damper soils. To kill the squaw currant (*R. cereum*)—an important species in Oregon and California—an average dose of a little more than a quart of Diesel oil is recommended.

New Station at Puerto Rico

Dept. of Agriculture is planning a tropical experiment station in Puerto Rico where the development of safe and sure sprays and insecticides will be undertaken. A tropical location is suggested, for plants and insects grow much faster than in temperate zones.

Booths at Recent N. Y. Flower Show

Agricultural sprays, insecticides, fungicides and plant food were displayed by a number of companies at the International Flower Show, held in N. Y. City, the week of Mar. 16th. Those with booths included Andrew Wilson, Inc., Springfield, N. J.; The C. B. Dolge Co., Westport, Conn.; Ridge Tool Co., Elyria Ohio; The Toquet Mfg. Co., Westport, Conn.; Stanco, Inc.; The Tennessee Corp.; Swift & Co., Chicago; Stimuplant, Inc.; and Goulard & Olena. The Toquet Mfg. Co. showed an interesting metal container for concentrated fertilizer which can be hooked into the garden hose line. A spray attachment can be fitted to the top of the container if desired.

Airplane Dusting Again

Dusting of crops from airplanes is no longer just a novelty. One company, the Delta Air Lines, has a fleet of 8 or 10 planes in the southeast Florida section available for this work. At Pompano, Broward county, one well-known grower, H. L. Lyons, has donated the land and the Chipman Chemical Co., manufacturer of agricultural insecticides, and its distributer, the Hector Supply Co., have cleared the land for a landing field and a warehouse has been constructed on the property. Chipman is promoting the use of its new "Copper Hydro 40."

New Copper Spray Reported

Alexander A. Nikitin, University of Delaware chemist, reports the perfecting of a new copper spray. New copper fungicide is said to be chemically very stable and when subjected to weathering it retains many of its chemical, physical, and toxic properties, and there is no oxidation, carbonation, or agglomeration so that caking of the fine particles (of copper) is prevented. The fungicide, a ready-made blue powder to be mixed with water for spraying, will not crystallize, lose its own water content, or otherwise break down, no matter how long it is kept.

It is not affected by temperature, and can be mixed with other sprays with no loss of efficiency.

The discoverer pointed out the fungicide required no mixing or addition of lime or other material which would increase the bulk. Neither does it require spreaders or stickers.

Packaging, Handling and Shipping

¶Packaging Exposition "Clinic" Discussions Develop New Trends in Container Design as Well as Basic Principles to be Employed—

In connection with the 6th Packaging Conference and Exposition, held at the Pennsylvania, N. Y. City, Mar. 3-6, several instructive addresses were delivered on various phases of the general subject of packaging. "The Purpose of the Package," by Arthur E. Tatum, advertising manager, Bauer & Black:—Fundamental purposes of the package are to contain the commodity, to identify the commodity, and to identify the maker of the commodity. These things are elementary. Everyone knows them. Sometimes, however, they are not kept as clearly in mind as possible. Secondary functions of the package are to help sell the goods, to help the consumer in the use of the goods and, in some cases, for re-use. These secondary functions, their relation to the fundamental functions, their usefulness to the manufacturer, and some of their dangers were discussed.

The various secondary functions of the package may again be sub-divided. The function of helping to sell the goods divides into display value, advertising value, suitability to surroundings, and use, etc. The secondary functions of helping the consumer in the use of the goods divides into dispensing packages, applicator packages, special location packages, etc. The re-use function also divides into a variety of special applications. The obvious need in handling these various packaging functions is a proper sense of proportion and balance between them.

"The Family Group of Packages," by T. S. Green of the Norton Pike Co.:—"This subject should be examined from 2 quite distinct angles. We may consider what can be effectively done to give family resemblance to the products of 2 or more associated companies and, we should also consider the question as to how an individual concern may effectively distinguish its separate products by label or package so that the public will readily recognize that these products are all parts of a correlated line.

"The first—or family resemblance of the products manufactured by associated companies—provides means for standardization and simplification of design. It also permits each of the associated companies to share in the prestige which is created by the use of a uniform company or trade designation.

"In the 2nd, or group problem within a given concern, the purpose is to distinguish between the separate products of a given concern and yet to establish firmly in the mind of the public that a family bond exists.

"Adoption of a series of colors as identifications in an assorted line is not a pastime to be engaged in by the amateur. Engage the best color specialist you can find and then abide by his judgment All of us have our favorite colors and the one we may select may be beyond criticism when used alone but place this color beside another of your preference and 9 times out of 10 one or the other suffers by comparison. Furthermore, colors have shades or values within the same general color division as well as degrees of color intensity for each shade. So that with this infinite range of changing factors to select from, the uninitiated is certain to undo all of the benefits which may have been within his grasp from having adopted a finely balanced design if he is to rely upon his own judgment in the question of color treatment."

"Package Redesign," by Ray M. Schmitz, associate advertising manager, General Foods: Before any attempt is made to redesign a package we should assume that a good old-fashioned product analysis be undertaken: 1. Can our product be improved in substance or in form to make it more useful to consumers?; 2. Have we developed a competitive story which will appeal to consumers?; 3. Is our pricing structure sound?; 4. What kind of distribution do we have? Can it be extended?

These and many other questions relating to the flow of goods to consumers are fundamental. If they can be answered with reasonable satisfaction we are then in position to undertake packaging changes with assurance that they will not be hampered by some other merchandising factor which probably needs correction much more urgently.

Consumers are changing in their habits, in their outlooks, in their experiences. We must keep pace with them by changing too. There are 2 principal reasons why this is necessary: 1. Consumers are becoming more style conscious; 2. No product enjoys an everlasting franchise in its present form.

When should a package be redesigned? If you believe in the benefits of package design and see a need for improvement the change may be made at the nearest convenient date. Aside from this there may be specific reasons why a change is desirable; 1. Are you telling a story of quality to your consumers? Does your package give the appearance of quality as compared with your competitor? 2. Are you selling at competitive levels? Does your package give the appearance of being "worthmore"?

Study Competitive Packages Carefully

If you have any doubts on this score assemble a collection of your principal competitive products and coldly study your product by visual comparison with average price tags on each. Once you have determined upon a change in design there are some very practical aspects to be borne in mind: 1. How much relationship should your new package bear to its predecessor? I like to believe that any worthwhile product carries a personality in its dress. To my mind, a successful job of redesign should retain some association with the old package, unless there are demonstrated advantages in breaking away from the old personality. This places some restraint upon the designer but places no burden upon the consumers in easily following the change.

In this connection, it should be noted that successive steps of change have in some cases a particular advantage, although admitting that most of the news value is lost. There are conditions where a radical change will outlaw such an amount of goods in distribution that the cost for replacing old stocks is a tremendous expense. In such instances a gradual change is imperative. 2. Careful planning should precede the introduction of the new package. The transition should occur at the period when outstanding stocks are usually low and the trade should be educated to move out the older goods before displaying the new. Transfer of stocks from certain areas to other parts of the territory may be necessary. For this purpose, quite frequently stock counts by customers are obtained with indications of the normal period required for turning the stocks.

Finally, in merchandising the package a new dress gives a tremendous lift in gaining renewed attention from all factors in distribution. Your salesmen respond, displays are more frequent. Consumers respond, they feel a new interest in the product. Back fence gossip and bridge table talk sometimes include "Have you seen the new package that So and So is using?" Even the advertising may include a new slant, springing from the redesigned package.

The Expellometer is a container for the Expello Corp.'s product, Expello, a moth crystal. It is to be hung in the closet and indicates by a moving hand when the supply of crystals is running low. Company is located at Dover, N. H.

One of the most novel "tie-ups" between a product and the package that has come to the attention of this department in a long time is that developed by Drums, Inc., of Detroit, for its all-purpose fabric cleaner. Below, fly time is almost here and Gair Thames Containers, Inc., has developed a novel corrugated paperboard display stand for the "P. D. Death-Tested Insect Spray" of Sinclair Refining.

New Products— New Packages

National Carbon is marketing a companion product, "Eveready Cooling System Cleaner," to its famous "Prestone" anti-freeze.

The Barrett Co. has completely redesigned the packages for its moth-preventive line. In addition to the container shown below Barrett is offering in new packages moth nuggets with various scents, also moth flakes and the older type of moth balls.

Merck is widening its "Sovereign" line of chemical specialties with a new line of automotive chemical specialties, including a radiator and engine cleaner which has been subjected to severe merchandising tests for over 2 years. The present Merck line in the automotive field is shown in the photograph below.

INDUSTRIAL CHEMICALS

NOW AVAILABLE—THE FOLLOWING LINE OF ASSOCIATED ORGANIC CHEMICALS SERVING THE SYNTHETIC RESIN, SOLVENT PLASTICIZER AND PHARMACEUTICAL INDUSTRIES.

NATIONAL ANILINE

MALEIC (TOXILIC) ACID

SUCCINIC ACID

MALEIC (TOXILIC) ANHYDRIDE

SUCCINIC ANHYDRIDE

MALIC ACID

FUMARIC ACID

PHTHALIC ANHYDRIDE

DESCRIPTIVE BOOKLET ON REQUEST.

INTERMEDIATES

NATIONAL ANILINE AND CHEMICAL COMPANY, INC.

Intermediates Division *Bowling Green 9-2240*

40 RECTOR STREET NEW YORK, N. Y.

Branches and Distributors throughout the World

NATIONAL N QUALITY

New Trade Marks of the Month

333,890

PROTEC

345,522

TEC-MITE

360,478

370,604

ANTUBE
THE ONE DROP
ANT KILLER

353,320

363,129

370,698

354,715

363,433

VELLO-TEMPERO

366,641

PREST-O-SEAL

367,734

COMAL

371,242

FLOTEX

371,399

SOLUGUM

371,401

KATHENE

371,416

BUG-A-BOO

359,648

368,773

FLAKO

370,097

Diglycol Stearate

371,044

Trade Mark Descriptions†

333,890. Charles C. Plumb (C. C. Plumb Co.), Providence, R. I.; filed Jan. 13, '33; for asphalt paint; use since Nov. 1, '32.

345,522. Tennessee Eastman Corp.; filed Dec. 30, '33; for vermicide; use since Oct. 25, '33.

353,320. The Cochran Co., Cleveland; filed June 29, '34; for paints, paint materials, polishes and removers; use since June 23, '34.

354,715. Windsor-Lloyd Products, Inc., Wilmington, Del.; filed Aug. 6, '34; for hydraulic shock absorber fluid and brake fluid; use since Jan. '33.

359,648. Industrial Chemical Sales, N. Y. City; filed Dec. 26, '34; for industrial alcohol; use since Aug. 11, '28.

360,478. Kimball Corp. (Red Head Products, Inc.), Cedar Rapids, Iowa; filed Jan. 21, '35; for toilet bowl cleaners; use since Aug. 4, '34.

363,129. Titan Co. A/S., Fredrikstad, Norway; filed Mar. 28, '35; for paints and paint materials; use since Dec. '33.

363,433. I. F. Laucks, Inc., Seattle; filed Apr. 5, '35; for paint color concentrates and fresco colors; use since Mar. 30, '35.

366,641. Prest-O-Lite Battery Co., Speedway, Ind.; filed June 25, '35; for storage battery sealing compound; use since Apr. 18, '35.

367,734. Penola, Inc., Pittsburgh; filed July 26, '35; for cutting oil; use since May 31, '35.

368,773. The Fla-Tex Products Co., Flatonia, Tex.; filed Aug. 28, '35; for de-odorizing, decolorizing powdered filtration agent used with gasoline and solvents; use since Aug. 1, '34.

370,097. Glyco Products, N. Y. City; filed Oct. 7, '35; for textile emulsifying and thickening agents; use since Sept. 30, '31.

370,604. H. M. Epstein (Buckeye Chemical & Specialty Co.), N. Y. City; filed Oct. 21, '35; for ant-killing preparation; use since Jan. '35.

370,698. L. Roy Davenport (Embalming Research Institute), Chicago; filed Oct. 23, '35; for embalming preparations; use since Sept. 10, '35.

371,242. Windsor-Lloyd Products, Wilmington, Del.; filed Nov. 5, '35; for rust-proof antifreeze; use since Oct. 1, '35.

371,399. Soluol Corp., Providence, R. I.; filed Nov. 9, '35; for gums and resins used in textile processes; use since July 1, '35.

371,401. Surface Combustion Corp., Toledo; filed Nov. 9, '35; for air conditioning absorbent liquids; use since Oct. 29, '35.

371,416. Consolidated Chemical Laboratories, St. Louis; filed Nov. 11, '35; for germicide and insecticide; use since Jan. 11, '30.

371,044. Sherwood Petroleum, Brooklyn; filed Oct. 31, '35; for irradiated petrolatums; use since Oct. 1, '35.

Merck used a 500-line insertion in newspapers for Creolin disinfectant in many of the flood areas.

*Chemical Specialty Patents**

Production of light weight plasters by calcining crushed gypsum, and mixing wet mixture with an accelerating agent. No. 2,031,585. John C. Best and Frank Lee Marsh to The Best Bros. Keene's Cement Co., all of Medicine Lodge, Kans.

Special, stable lubricating oil containing a viscuous hydrocarbon base, a heavy metal soap, and a phenolic solubilizing agent. No. 2,031,986. Reginald K. Stratford and Jack L. Huggett, Sarnia, Ontario, Canada, to Standard Oil Development Co.

Fingernail polish remover consisting of solution of lacquer solvent and non-drying nail-softening oil. No. 2,032,042. Clifford E. Bishop, Rego Park, Long Island, N. Y., to Northam Warren Corp., N. Y. City.

Waterproofing agent for vegetable-tanned leather comprising aqueous solution of a quaternary salt of either ammonium, phosphonium, or sulfonium. No. 2,032,097. Henry Alfred Piggott and George Stuart James White, Blackley, Manchester, England, to Imperial Chemical Industries Ltd., Westminster, England.

Light household cement comprising reaction products of a mixture of 62% powdered flint, 14% sodium silicate, 14% water, and 10% aluminum fluoride. No. 2,032,142. Leon McCulloch, Pittsburgh, to Westinghouse Electric & Mfg. Co., East Pittsburgh.

Cleaner for metal surfaces consisting mainly of kerosene with an oleic acid soap, cresylic acid, and water. No. 2,032,174. Carl Johnson, East Orange, N. J., to Oakite Products, Inc., a corp. of N. Y.

Method of cleaning and coating painted or varnished surfaces by applying water solution of glue and either borax, sodium carbonate, or tri-sodium phosphate. No. 2,032,372. Elizabeth P. MacDonald and Naomi W. Stenglein, Saginaw, Mich.

Metal cleaning composition comprising 10 to 25 parts neutralized sulfonated vegetable oil, 5 to 15 parts emulsifying agent of sodium oleate or alginate, and 30 to 60 parts kieselguhr and activated carbon as absorbent. No. 2,032,482. Sidney M. Hull, Western Springs, Ill.

Photographic emulsion of silver halide which contains a sulfur or selenium dyestuff. No. 2,032,506. Wilhelm Schneider, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Soap comprising hydrocarbon solvent, an aluminum soap, and triethanolamine. No. 2,032,528. Jacob Dolid, Bridgeport, Conn.

Method of fireproofing textile yarn or fabric using a mineral acid alkylolamine salt. No. 2,032,605. William Whitehead, Cumberland, Md., to Celanese Corp. of America, a corp. of Del.

Adhesive tape coated with adhesive and a metallic coating, comprising powdered metal, casein, clay, and wax. No. 2,032,845. Ferdinand W. Humphner, Oak Park, Ill., to Mid States Gummed Paper Co., a corp. of Ill.

Emulsion used in treating sewing thread comprising water-in-oil type liquid emulsion of resin in organic solvent, and water. No. 2,033,120. George H. Brother, Marblehead, Mass., to Boston Blacking & Chemical Co., Boston.

Alkaline textile assistant comprising alkali, water, and soluble salt of aliphatic carboxylic acid. No. 2,033,125. Frederick Baxter Downing, Carneys Point, N. J., and Richard Gesse Clarkson, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Electrical insulating material comprising mainly pure magnesium or beryllium oxides. No. 2,033,300. Reinhold Reichmann, Berlin, Germany, to Siemens & Halske, Akteingesellschaft, Siemensstadt, near Berlin, Germany.

Floor covering or filling material comprising plaster of Paris, a filler, and sodium thiosulfate rendered non-caking with calcium carbonate. No. 2,033,421. Ernst Eichert, Weinsberg, Germany; one-half to Martin Weger, Schweinfurt-am-Main, Germany.

Drilling mud used in lining oil or gas wells comprising liquid vehicle, clay, and a hydrocarbon-soluble substance. No. 2,033,509. Clifford P. Bowie, Berkeley, Cal.

Waxing and polishing material made up of wax which contains a high molecular weight ketone. No. 2,033,544. Anderson W. Ralston and Carl W. Christensen, to Armour & Co., all of Chicago.

Specialty patents continued on next page.

* Patents covered in this issue include those appearing in the *U. S. Patent Gazettes*, Feb. 25 to Mar. 17.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, Feb. 25 to Mar. 17.

Specialty Patents (Continued)

Filler for gas masks comprising shredded redwood bark impregnated with the necessary reactant. No. 2,033,698. John Finn, Jr., Berkeley, Cal., to E. D. Bullard Co., San Francisco.

Electrolytic treatment of aqueous liquids containing soluble soap whereby the free fatty acid is liberated at the anode. No. 2,033,732. Oskar Neiss to firm Hanseatische Muhlenwerke Akteingesellschaft, both of Hamburg, Germany.

Impregnating material for use on cigarette paper comprising dilute solution of nitrocellulose and paraffin. No. 2,033,791. Nathan Sulzberger, N. Y. City.

Tree dressing material containing asphalt, rubber distillation residue, a plasticizer, an inert filler, and the necessary solvent. No. 2,033,869. Claude H. Smith, Tallmadge, Ohio, to Wingfoot Corp., Wilmington, Del.

Filler for tree cavities comprising inert filler, asphalt, and residue from rubber distillation. No. 2,033,870. Claude H. Smith, Tallmadge, Ohio, to Wingfoot Corp., Wilmington, Del.

Fireworks composition comprising an oxidizing agent, and particles of an alloy of two reducing agents, namely; either copper, silicon, or zinc, and either magnesium or aluminum. No. 2,033,966. Samuel Wiley, Metuchen, N. J.

Cleaning composition which will liberate HCl when dissolved in water, containing sodium bisulfate and heat-treated magnesium chloride. No. 2,034,070. Arthur S. Weygandt, Cleveland Heights, Ohio, to The Grasselli Chemical Co., Cleveland.

Insecticide oil composition for trees and foliage composed of mineral oil, mineral oil-fatty acid compounds, organic acid-alkali soap, esters of fatty acids, glycerine, and soluble starch in aqueous solution with alkali. No. 2,034,152. William C. Parrish, Portland, Oreg.

Dry, non-dusting seed disinfectant. No. 2,034,449. Frederick Lawrence Sharp, Blackley, Manchester, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

For Silk Stockings

Tuxite, Inc., 9 E. 40th st., has introduced to the drug and department store trade through Nation Wide Distributors, Inc., of that address, a product called Tuxite, said to "triple the life of silk stockings."

"Not a soap but a special treatment," rinsing with Tuxite "increases stocking elasticity and makes them run-resistant and rainspot-proof." Aluminum sulfate, said John B. Milliken, secretary of Tuxite, Inc., forms the base of the product.

Premium Exposition in May

An innovation at the 6th annual Premium Exposition to be held at the Palmer House, Chicago, May 4 to 8, will be a premium clinic, at which advice will be given to manufacturers. Round-table sessions will also be held. Speakers include Evalyn E. Grumbine, *Child Life*; J. L. Harvey, Blackett-Sample-Hummert, Inc.; Andrew M. Howe, *Printers' Ink*; and E. G. Rentley, Brown & Williamson. So far 95% of the available space has been sold.

Sanitary Suppliers to Meet

The National Sanitary Supply Association will hold its annual meeting at the New Yorker, N. Y. City, on June 3-5. Besides a very interesting program of papers and discussions on subjects of direct interest to manufacturers and distributors of sanitary supplies, a large number of companies will have exhibits of their products. E. C. Kratsch, 734 E. Lexington st., Milwaukee, is secretary.

Parsons Ammonia, N. Y. City, is issuing a premium catalog, listing prizes to be given to wholesale salesmen. Premium Service, N. Y. City, handles all the details and shipping.

371,417
Drain-King

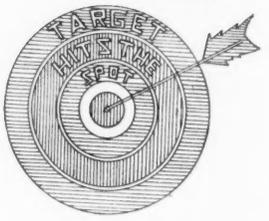
371,769
SENTRY

372,273
COSO EARTH
A PYRAMID PRODUCT

371,647
OIL FIELD CEMENT

371,786
Brittany

372,294



371,648
OIL FIELD CEMENT

OIL FIELD CEMENT

371,809
Chromatone

371,897
DAB-IT!

372,308

371,953
ECONO-MYLES

371,960
MIRASOL

371,765
MONITOR

371,961
CARBASOL

372,457
SUPERGRIP

371,766
GEM

372,091
MIKERDPAKE

372,759

372,141
FLO-FLEX

371,767
CRUISER

372,234
Tech-Wax

Descriptions

371,417. Drain-King Corp., Chicago; filed Nov. 11, '35; for drain pipe openers; use since Apr. '32.

371,647. Missouri Portland Cement, St. Louis; filed Nov. 16, '35; for portland cement; use since Nov. 13, '35.

371,648. Missouri Portland Cement; filed Nov. 16, '35; for portland cement; use since Nov. 13, '35.

371,765. Globe Roofing Products, Chicago; filed Nov. 20, '35; for asphalt composition roofing and building papers; use since Apr. '34.

371,766. Globe Roofing Products, Chicago; filed Nov. 20, '35; for asphalt composition roofing and building papers; use since Apr. '34.

371,767. Globe Roofing Products; filed Nov. 20, '35; for asphalt composition roofing and building papers; use since Apr. '34.

371,769. Globe Roofing Products; filed Nov. 20, '35; for asphalt composition roofing and building papers; use since Apr. '34.

371,786. Seplowitz Bros. (Britton Co. of America), N. Y. City; filed Nov. 20, '35; for paints, varnishes, and paint enamels; use since Jan. 1, '34.

371,809. Defender Photo Supply, Rochester; filed Nov. 21, '35; for photographic print packages; use since Oct. 10, '35.

371,897. Ira I. Slomon, Long Island City, N. Y.; filed Nov. 22, '35; for stainless adhesives and glues; use since Oct. 1, '35.

371,953. E. A. Theise (Theise Mfg. Co.), Sublette, Kans.; filed Nov. 26, '35; for gasoline energizer and carbon solvent; use since Jan. '35.

371,960. Carbogen Chemical, Garwood, N. J.; filed Nov. 25, '35; for varnish resins and their solutions; use since Nov. 10, '35.

371,961. Carbogen Chemical; filed Nov. 25, '35; for varnish resins and their solutions; use since Nov. 10, '35.

372,091. James Q. du Pont (Mike-Ro-Pake), Johnstown, Pa.; filed Nov. 29, '35; for composition imparting opacity to photographic and photo-engraving films, plates, etc.; use since Oct. 22, '35.

372,141. Norfolk Paint & Varnish, Quincy, Mass.; filed Nov. 30, '35; for paints and enamels; use since Jan. 1, '33.

372,234. C. E. Bolund (Tech. Mfg. Co.), Chicago; filed Dec. 4, '35; for compounds preventing offset, crystallization and sticking of printing ink; use since Feb. '34.

372,273. Chamberlain Co., Los Angeles; filed Dec. 5, '35; for raw or partly processed clay used in neutralizing, filtering, and bleaching; use since May 14, '35.

372,294. Benjamin Weiss (Ohio Chemical Co.), Brooklyn, N. Y.; filed Dec. 5, '35; for compound stopping leaks in automobile radiators; use since Sept. 1, '32.

372,308. C. H. Betts (Standard Fluids), Baltimore; filed Dec. 6, '35; for embalming chemicals; use since May 20, '34.

372,457. Boston Blacking & Chemical, Boston; filed Dec. 10, '35; for adhesive cement used in boot and shoe industries; use since Aug. 12, '35.

372,759. Beau Peep Products, Chicago; filed Dec. 18, '35; for shoe cleaner; use since Dec. 6, '34.

372,586

372,657
Smooth-Flex

372,685
ORTHOSIL

372,765
FIBROX

372,804
AMALITE

372,805
AMAPRO

372,806
AMACID

372,807
CHROMAVEN

372,808
AMANIL

372,809
AMRESIN

372,810
AMAPLY

372,811
AMERAN

372,812
AMERICAN ANILINE PRODUCTS INC. NEW YORK USA

372,813
AMANTHRENE

372,830
CHEMICALS BY GLYCO

372,866

372,871
SAFEFLOW

372,930
COT-O-NOL

372,932
RAY-O-NOL

372,933
WUL-O-NOL

372,942
ODORA

372,951
HYCLORITE

372,952

372,984
SUNNY DAY

373,002
ALEMITE

373,087
E-A-K

Descriptions

372,586. Chilean Nitrate Sales, N. Y. City; filed Dec. 13, '35; for nitrate of soda; use since Sept. 2, '35.

372,657. Crescent Chemical, Philadelphia; filed Dec. 16, '35; for compound aiding in laundry starch cooking; use since Dec. 10, '35.

372,685. Penn Salt Mfg.; filed Dec. 16, '35; for alkaline industrial detergent; use since Sept. 3, '35.

372,765. Jacob W. Geiger, N. Y. City; filed Dec. 18, '35; for water-and-air-proof coating composition; use since Dec. 9, '35.

372,804. American Aniline Products, N. Y. City; filed Dec. 19, '35; for wetting out agents; use since Jan. 6, '34.

372,805. American Aniline Products; filed Dec. 19, '35; for dyestuffs; use since Oct. 19, '31.

372,806. American Aniline Products; filed Dec. 19, '35; for dyestuffs; use since Nov. 30, '31.

372,807. American Aniline Products; filed Dec. 19, '35; for dyestuffs; use since July 12, '32.

372,808. American Aniline Products; filed Dec. 19, '35; for dyestuffs; use since May 23, '32.

372,809. American Aniline Products; filed Dec. 19, '35; for dyestuffs; use since Nov. 20, '34.

372,810. American Aniline Products; filed Dec. 19, '35; for dyestuffs; use since Jan. 8, '34.

372,811. American Aniline Products; filed Dec. 19, '35; for dyestuffs; use since Feb. 13, '31.

372,812. American Aniline Products, N. Y. City; filed Dec. 19, '35; for industrial dyestuffs; use since Dec. 31, '18.

372,813. American Aniline Products; filed Dec. 19, '35; for dyestuffs; use since Nov. 11, '31.

372,830. Glyco Products, N. Y. City; filed Dec. 19, '35; for chemicals used in adhesive manufacture; use since Nov. 5, '35.

372,866. Whittemore Bros. Corp., Cambridge, Mass.; filed Dec. 19, '35; for shoe cleaner, polish and coloring compound; use since Nov. 19, '35.

372,871. Destileria Serralles, Ponce, P. R.; filed Dec. 20, '35; for denatured alcohol; use since Oct. 1, '35.

372,930. Quaker Chemical Products, Conshohocken, Pa.; filed Dec. 21, '35; for textile assistants; use since Nov. 27, '35.

372,932. Quaker Chemical Products; filed Dec. 21, '35; for textile scouring agent; use since June 19, '24.

372,933. Quaker Chemical Products; filed Dec. 21, '35; for textile assistants; use since Nov. 27, '35.

372,942. Odora Co., N. Y. City; filed Dec. 21, '35; for insecticides; use since Aug. 1, '27.

372,951. Bethlehem Laboratories, Pittsburgh; filed Dec. 23, '35; for antiseptics, germicides, and deodorants; use since June 10, '20.

372,952. Bethlehem Laboratories; filed Dec. 23, '35; for antiseptics, germicides, and deodorants; use since July 17, '15.

372,984. Miami Products & Chemical, Dayton, Ohio; filed Dec. 23, '35; for liquid laundry bleach; use since Nov. 15, '34.

Peterman Campaign Reported

William Peterman, Inc., manufacturers of household insecticides, will begin a new advertising campaign in May, according to the Thompson-Koch Co., using daily and weekly newspapers and national magazines. Products to be featured are Peterman's Discovery, Peterman's Roach Food and Peterman's Ant Food. A special house-cleaning tie-up window display is being offered to dealers. It includes a 20-by-30-inch display card in color, suggesting housecleaning necessities. A photograph for guidance, illustrating the "clean-up" display window, is included in the material.

Neva-Wet Bottling Appoints

Neva-Wet Bottling, Bloomfield, N. J., distributor of Neva-Wet liquid for textile products, has appointed Lennen & Mitchell, Inc., N. Y. City, as its advertising agency. Philip W. Lennen is handling the account. The advertising of the fur division of Neva-Wet remains with The Grey Advertising Agency, Inc.

Starts Sales Service

Cuprinol, Inc., Boston, has appointed the Federal Sales Service, Inc., that city, to build a national sales service for its wood, canvas and fabric preservatives. Same company has also appointed J. C. Bull, Inc., New York Advertising agency, to handle its advertising account. Trade publications are being used with consumer copy to follow.

"Glo" Advertising Campaign

Newspaper and radio advertising are being used in a new campaign on Glo, an aluminum cleanser, product of James H. Rhodes & Co., Chicago. Campaign will be extended to Cincinnati immediately and other cities later. The Chicago office of Hanff-Metzger, Inc., is directing the Glo campaign. Hal W. Blakeslie is the account executive.

"Dic-a-Doo's" New Package

Dic-a-Doo paint cleaner, product of The Patent Cereals Co., Geneva, N. Y., now comes in a new one-lb. package, which replaces the old one-and-one-quarter-lb. box. It has been completely redesigned.

Seeks a Receiver

Continental Chemical, maker of deodorants, with an office in Newark and a plant at Woodbridge, N. J., is reported as seeking a receiver.

Dayton with J. B. Ford

Val Dayton has joined J. B. Ford and will cover the northern New Jersey territory. Mr. Dayton has previously spent 4 years with Alden Speare's Sons and a year with Merchants Chemical.

S-W's New Sales Talk

Sherwin-Williams has begun to talk about "beauty and protection," in terms of paint, and 12 to 18 months to pay for it, in 24 magazines.

373,131

VULCACEMENT

373,169

VICTOR
Supreme

373,193

MEDICO

373,230

Smoothie

373,258

FERN PARK

373,284

AQUANAMEL

373,290

AMOCO

373,314

Loosite

373,348

AMERITE

373,350

"Old Faithful"

373,367

Sta-Glo

373,469

UTILITY

DRY STEAM

373,487

CLAR-O

373,488

durocote

373,537

NEBB'S

373,540

FABRITEX

373,588

Potnit

373,592

P-2-F

373,656

SOVALEX

373,707

MYTAN

373,916

374,125

PAINTEURIZE

374,202

Marinco

374,226

SOLVOLINE

374,231

RESYNITE

Descriptions

373,002. Stewart-Warner, Chicago; filed Dec. 23, '35; for anti-freeze solutions; use since Dec. 19, '35.

373,087. Tennessee Eastman, Kingsport, Tenn.; filed Dec. 26, '35; for photographic developers and rubber compounding chemicals; use since Sept. 13, '35.

373,131. Dewey & Almy Chemical, Cambridge, Mass.; filed Dec. 28, '35; for rubber-like adhesives; use since Oct. 23, '35.

373,189. Victor Stanziale (Victor Supreme Metal Polish Co.), West New York, N. J.; filed Dec. 30, '35; for metal polish; use since Nov. 14, '35.

373,193. H. W. Hoffman, Buffalo; filed Dec. 19, '35; for disinfectants, germicides, and deodorants; use since June 6, '35.

373,230. Russia Cement Co., Gloucester, Mass.; filed Dec. 31, '35; for paste or fluid vegetable adhesives; use since Dec. 9, '35.

373,258. L. Klein, Inc., Chicago; filed Jan. 2, '36; for household cleaning, scouring, polishing and purifying cleanser; use since Nov. 7, '35.

373,284. Continental Asbestos & Refining, N. Y. City; filed Jan. 2, '36; for non-inflammable, non-oleaginous ready mixed paint in stick form; use since Nov. 20, '35.

373,290. American Oil Co., Baltimore; filed Jan. 3, '36; for anti-freeze; use since Oct. 25, '35.

373,314. Motor Fume Utilizer Corp., Long Island City, N. Y.; filed Jan. 3, '36; for sludge solvents and crank case cleaners; use since Dec. 1, '35.

373,348. American Anode, Inc., Wilmington, Del.; filed Jan. 6, '36; for aqueous rubber dispersions containing compounding materials; use since Oct. 31, '35.

373,350. American Crayon Co., Sandusky, Ohio; filed Jan. 6, '36; for varnish sealer and finish; use since Mar. 11, '35.

373,367. Myrtle Darrow (The Darrow Co.), Tulsa, Okla.; filed Jan. 6, '36; for varnish and varnish extender; use since Nov. '35.

373,469. Utility Laboratory, Inc., Brooklyn; filed Jan. 8, '36; for boiler cleaner and steam conditioning preparation; use since June 1, '33.

373,487. Corn Products Refining, N. Y. City; filed Jan. 9, '36; for starch product used as coagulant in coal wash-water; use since Nov. 29, '35.

373,488. Louis DeJonge & Co., N. Y. City; filed Jan. 9, '36; for paper-waterproofing compound; use since Dec. 9, '35.

373,537. Nebb Products, N. Y. City; filed Jan. 10, '36; for shoe polishes, dressings and dry cleaners; use since Nov. 22, '35.

373,540. Royce Chemical, Carlton Hill, N. J.; filed Jan. 10, '36; for gums used in textile printing; use since Feb. 18, '32.

373,588. F. W. Berk & Co., N. Y. City; filed Jan. 13, '36; for nitrogen-potash fertilizers; use since Aug. 10, '35.

373,592. Edward C. Chandler (Pioneer Chemical & Mfg.), Cleveland; filed Jan. 13, '36; for dishwashing compounds; use since Jan. 1, '35.

373,656. Socony Paint Products, N. Y. City; filed Jan. 14, '36; for paints and paint materials; use since Feb. 16, '35.

373,707. The Tannin Corp., N. Y. City; filed Jan. 13, '36; for myrobalan extract; use since Oct. 17, '35.

373,916. Fuld Bros., Baltimore; filed Jan. 21, '36; for floor-polishing waxes; use since Jan. 9, '36.

374,125. Camel Lead Color & Chemical Products Mfg., Brooklyn; filed Jan. 27, '36; for ready mixed paint and paint enamel; use since Dec. 21, '35.

374,202. Marine Chemicals, South San Francisco; filed Jan. 28, '36; for magnesium hydroxides, oxides, and carbonates; use since Jan. '35.

374,226. J. S. Brady (Solvoline Sales), Kenmore, N. Y.; filed Jan. 29, '36; for non-explosive dry cleaning fluid; use since June 1, '32.

374,231. Colfanite Products (The Resynite Co.), Seattle, Wash.; filed Jan. 29, '36; for paints, varnishes, polishes, etc.; use since Jan. 6, '36.

New Antiseptic Makers

Charles G. Kull, William Trautman, and Walter Geigele organize Pemo Chemical Co., in Columbus, Ohio, to produce a new antiseptic product. Capitalized at $10,000, new company will begin production by first of the year.

Universal Antiseptic & Research Laboratories, Bristol, Tenn., gets State charter. Incorporators are C. M. Jefferson, E. H. DuBose, A. J. Higgins, and T. H. Morris.

Other Incorporations

Petroleum Corp., Wilmington, Del. Capitalized at $40,000. Chartered by M. M. Lucey, H. I. Martin, and L. S. Dorsey, all of Wilmington, Del.

Royal Crown Laboratories, Inc., Suite 1300, 7 S. Dearborn st., Chicago, Ill. Capitalized at 50,000 shares, no par value common. Chartered by Harvey J. Fisher, Rudolph G. Schroth, and George M. Ebert.

Spazier Chemical Products, Inc., Wilmington, Del. Capitalized at $500,000. Chartered by L. R. Wilson, L. A. Irwin, and M. A. Desmond, all of Wilmington, Del.

Super-X Chemical Co., Portland, Ore. Capitalized at $1,000. Chartered by Robert A. Nagel, V. Lyle McCroskey, and R. S. Geer.

Ugo Solutions Co., Buffalo, N. Y. Chartered by Ugo Stevanato & associates.

Dixie Cleanser Corp., Collierville, Tenn., capitalized at 10,000 shares of no par value stock, with Hillsman Taylor, H. W. Mann, Sr., and Hugh W. Mann, Jr., incorporators.

24-H Chemical Co., Knoxville, Tenn., capitalized at $1,000, with N. G. Riggins, Martin Allen and E. M. Allen incorporators.

Davenport Chemical Co., Camden, N. J.; $50,000 preferred, 1,000 shares common, no par. Agent, Charles E. Kulp.

S. A. Dry Cleaning Manufacturing Co., Inc., San Antonio, Texas; capital stock, $6.000. Incorporators: Sam Rosenberg, Jacob Rosenberg, J. I. Lawson.

Chemstix Chemicals, Inc., 35 East Wacker Drive, Chicago. Fifty shares p. v. common. Incorporators: Anna Overshaften, William G. Bopp, James P. Econmoos. Correspondent: Reeda and Peace, 35 East Wacker Drive.

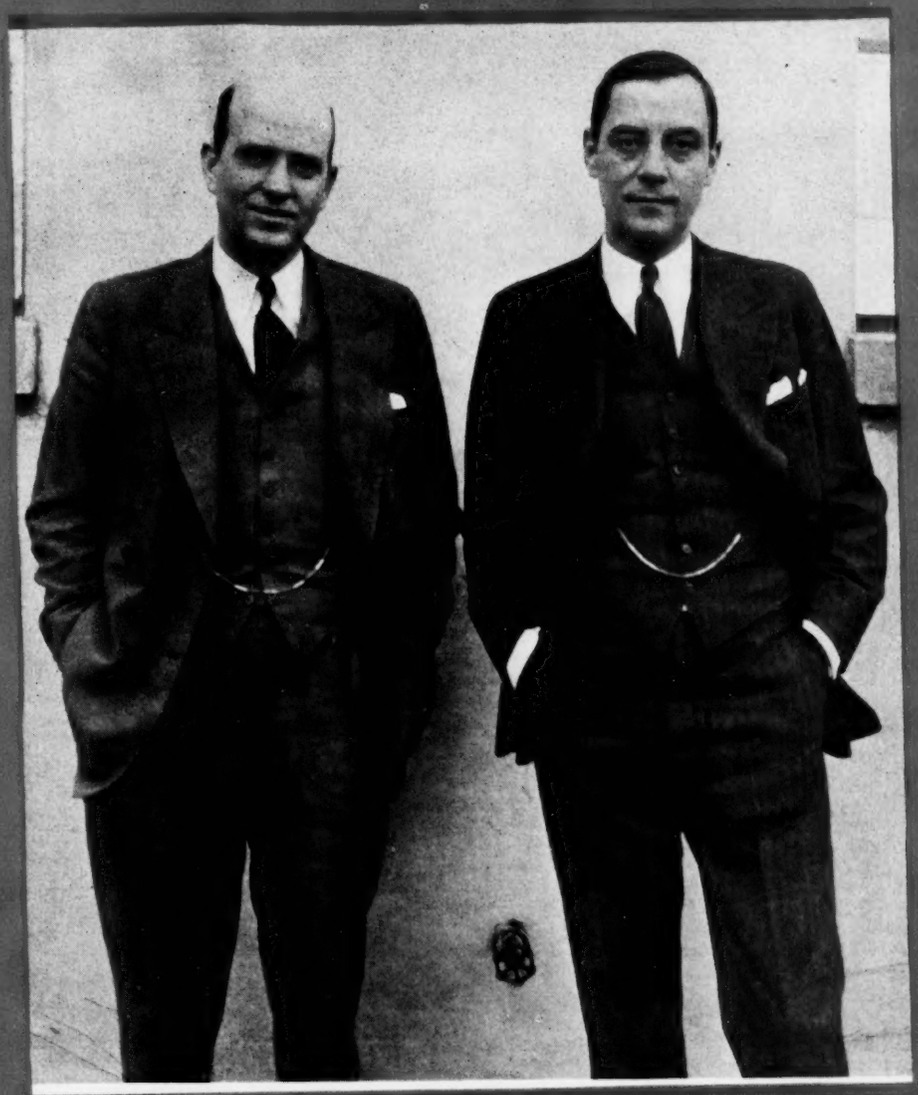
Hamilton Chemical Products, Brockton, Mass., capital $25.000, incorporators, Ashton Hamilton, Kenneth D. Hamilton, both of Brockton, and Charles M. Albion, Boston.

Signs F.T.C. Stipulation

Gracon Manufacturing Co., 2119-23 Gravois st., St. Louis, recently signed a F.T.C. stipulation to discontinue assertions that its product, "Co-Lube," offered as a graphite lubricant for motors, increases speed of automobiles 20% and assures 20% to 75% savings in gas and oil mileage; that it will save repair bills and improve motors, and that it will cause motors to have good lubrication after running 4,000 miles without a change of oil.

CHEMICAL

NEWS & MARKETS



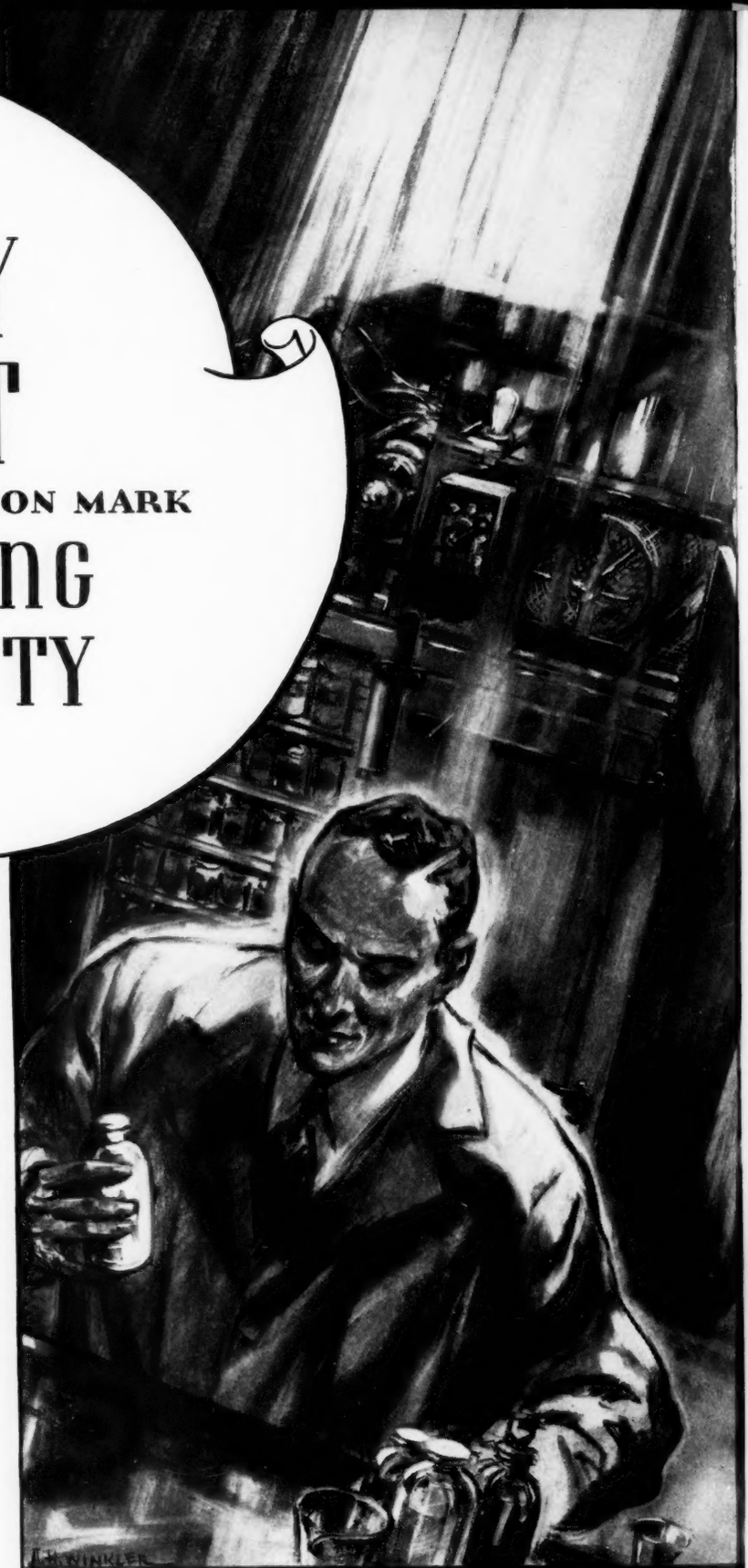
Charles A. Thomas and Carroll A. Hochwalt, whose laboratories have recently been taken into the growing Monsanto family.

HOW THE

HUMIDITY CABINET

TAKES THE QUESTION MARK OUT OF KEEPING QUALITY

Let's get down to facts



After all . . . simply to say that such-and-such a product is free-flowing . . . or non-caking . . . or non-reacting is telling only half the story. Under what specific conditions is it free-flowing? Between what temperature limits? What degree of humidity? Exactly to what extent is it non-reacting, etc.?

Day after day our research laboratories are called upon to answer questions such as these. For example, an ingeniously conceived "humidity cabinet" is constantly being referred to for definite information about the keeping quality of various products. Facts that leave no questions unanswered are wanted!

We have no patience with generalities. Perhaps this uncompromising demand for exactness has been partly responsible for the Victor Chemical Works having become the world's largest producers of food grade phosphoric acid and its salts.

Crowding A Year Into A Few Weeks

By mechanically controlling both temperature and humidity in a specially designed "humidity cabinet," the effects of a year or more on the keeping quality of a product may be crowded into the brief space of a few weeks.

●

Victor Chemicals: Phosphoric acid . . . mono, di, and tri-calcium phosphate . . . mono, di, and tri-sodium phosphate . . . sodium pyro-phosphate . . . sodium acid pyro-phosphate . . . mono and di-ammonium phosphate . . . phosphoric anhydride . . . phosphorus . . . ferro phosphorus . . . triple super phosphate . . . sodium formate . . . formic acid . . . oxalic acid . . . sodium oxalate . . . magnesium sulphate (epsom salt).

VICTOR *Chemicals*

VICTOR CHEMICAL WORKS

141 W. Jackson Blvd., Chicago, Ill.

New York · Nashville · Kansas City

LOWER RATES JUMP IMPORTS

Statistics Prove Trade Agreement Hurts U. S. Production—Chemical Foundation Backs Gasoline-Alcohol Fuel Project—Allied Seeks Injunction Against SEC—

Statistics taken from the reports of the Dept. of Commerce disclose the recent sharp rise in the importation of important chemicals on which the U. S. tariff rates were reduced under the Belgian Trade Agreement which became effective May 1, '35.

In certain chemicals and raw materials, notably aluminum sulfate and chalk or whiting, the increases are startling. For example, the imports of aluminum sulfate for 1935 (4 months at the old rate and 8 months at the new rate) amounted to 1,938,715 lbs., as against only 764,901 lbs. for the entire year of 1934. For whiting, the figures are 8,761,976 lbs. and 1,629,426 lbs. respectively. In the table below the jump in imports after the lower rates were placed in effect is plainly shown by comparing the tonnages in the 1st 4 months at the old rate with the tonnages for the last 8 months at the rates now prevailing.

To Aid the Farmer

Production of gasoline-alcohol motor blend fuels on an industrial scale will commence May 1st, according to present plans, in a reconstructed distillery owned by the Bailor Manufacturing Co. at Atchison, Kans. Project is being fostered by the Farm Chemurgic Council and the Chemical Foundation and operations will be under the general direction of Prof. L. M. Christianson, Ames, Iowa. According to reports a new and revolutionary process will be used, and the plant will produce 10,000 gal. of anhydrous alcohol daily, using corn as a raw material. Final product will be called "Agrolene." It is claimed that the material will have a high octane rating and will be superior to motor fuel. It is said that the Foundation is spending between $100,000 and $200,000 on the project. Other figures of interest that have been quoted are—an annual production of 3½ million gal. requiring a million and a half bu. of grains.

Dr. Christianson, who left the chemistry faculty of Iowa State a year ago to join the foundation, is optimistic concerning the practicability of alcohol-gasoline as a motor-fuel.

"We expect," he said, "that several more plants will be built within the next year." He predicted the Atchison plant will prove an immediate boon to the adjacent territory—by providing more than $750,000 income to farmers and jobs for many men.

"Plant," he said, "is intended as a demonstration unit and all the records will be open to the public as a practical commercial scale demonstration of the feasibility of the power-alcohol plan."

Effect of the New Tariff Rates on Imports (in pounds) of Several Important Chemicals

Article and Countries	Year 1934	Year 1935 Old rate[1] First 4 mos.	Year 1935 New rate[2] Last 8 mos.	Year 1935 Total year
Aluminum Sulfate (total)	764,901	288,029	1,650,686	1,938,715
Belgium	742,179	284,372	1,423,533	1,707,905
France	.....	.....	40,013	40,013
Germany	.....	3,657	132,025[3]	135,682
Sweden	.....	.....	55,115	55,115
United Kingdom	22,722	.....	.....	.....
Chalk or Whiting or Paris White: Dry, ground, or bolted (total)	1,629,426	788,576	7,973,400	8,761,976
Belgium	197,867	66,138	5,986,666	6,052,804
Denmark	501,623	133,146	869,206	1,002,352
France	89,176	44,092	88,184	132,276
United Kingdom	840,760	515,200	909,200	1,424,400
Canada	.....	30,000	74,672	104,672
Germany, Sweden, Japan	.....	.....	45,472	45,472
Ground in oil (putty), total	27,514	41,618	3,308	44,926
Belgium	27,400	40,050	3,208	43,258
United Kingdom	114	1,568	.....	1,568
Canada	.....	.....	100	100
Flavoring Extracts, Fruit Flavors, Esters, Oils, and Essences, containing 20 to 50 per cent. alcohol (total)	23,941	7,364	14,527	21,891
Belgium	11,563	778	2,876	3,654
United Kingdom	2,035	1,783	6,489	8,272
Other Countries	10,343	4,803	5,162	9,965
Naphthalene, above 79° C.: Total (all from Germany)	66	99	.....	99
Cobalt Sulfate (total)	43,590	26,970	53,112	80,082
Belgium	42,400	5,500	39,600	45,100
Germany	1,190	21,470	13,512[3]	34,982
White Lead (pigment) (total)	30,267	7,175	4,772	11,947
Belgium	.....	.....	.....	.....
Austria	22,046	.....	.....	.....
United Kingdom	7,420	7,175	4,772	11,947
Other Countries	801	.....	.....	.....
Sodium Phosphate (except pyrophosphate) Total all grades	13,037	2,779	.....	2,779
Belgium	.....	.....	.....	.....
Germany	12,916	2,779	.....	2,779
Norway, Switzerland	121	.....	.....	.....

[1] Jan. 1 to April 30, 1935.
[2] May 1 to Dec. 31, 1935 (Belgium Treaty rates).
[3] May 1 to Oct. 15, 1935.

Guards Sales Figures

Allied Chemical on Apr. 4th served James M. Landis, S.E.C. chairman, with a subpoena in connection with a suit filed by the company in the 2d Circuit Court of Appeals in New York, seeking a permanent injunction against the commission, restraining it from publishing the sales figures contained in Allied's application for permanent registration.

Sales figures were contained in the corporation's application for permanent registration statement filed with the government last year in connection with the registration of its securities listed on the N. Y. Stock Exchange. When application was made a request was included to withhold publication of its investment portfolio, salaries and certain other sections of the financial report.

Policy of the commission has been to contest similar suits and proceed with the publication of data believed to be in the public interest, with the exception of cases in which court orders restrain it pending settlement of legal actions. Commission has received requests for confidential treatment from approximately 300 corporations, dealing individually with each issue.

Suit will be watched with keen interest in financial circles. Just what effect the "spanking" administered to the commission by the Supreme Court on Apr. 6th in the Jones Case will have, is still, of course, unknown. Court termed action of S. E. C. "arbitrary."

Four Outstanding Chemical Leaders Succumb

Industry for 2nd Month in Succession Loses Several Prominent Pioneers, A. H. Hooker, Kuttroff, Prochazka and Hamann—Billings, Gray Official, Taken Suddenly—Other Deaths—

Albert Huntington Hooker, 70, technical director of Hooker Electrochemical, an authority on electrolytic alkali and chlorine products, died Mar. 9th.

Mr. Hooker was born in Rochester and attended public schools and the University of Rochester. He left the university to enter business before being graduated, but later, after attending M. I. T. as a special student in chemistry, received the honorary degree as Master of Science from Rochester.

In 1888 he began his scientific career as a chemist with Dighton Color Works, Dighton, Mass. He then served successfully, in the same capacity, with the Cary Ogden Co., Chicago, and the Opaque Shade Cloth Co., Chicago, and from 1894 to 1907 was with Heath & Milligan Paint Manufacturing, Chicago, serving for a time as chief chemist.

Mr. Hooker entered the electro-chemical field in 1905 and took an active interest in the development of electrolytic alkali and chlorine products. He wrote widely on the subject and served successively as works manager and technical director of Hooker, which developed from an experimental plant to one of the largest producers of electrolytic alkali, chlorine and chlorine products in the world.

During the World War Mr. Hooker manufactured picric acid for the U. S., chloro-benzene for the French government and chemical products for gas warfare.

He was chairman of the N. Y. State Board for Licensing Professional Engineers and Land Surveyors, of which he was an original member, and a former director of the Power City Trust. He was a member of the A.I.Ch.E., the American Electrochemical Society, the Buffalo Engineering Society, the American Society for Testing Materials, the Faraday Society, the Society of Chemical Industry, the Institute of Chemical Engineers, the Petroleum Institute, the Societe de Chimie Industrielle, Tappi and the American Chemical Society.

Surviving are his wife, 2 sons, Roger Wolcott and Albert H. Hooker, Jr.; 3 daughters, Mrs. Richard Cary, Mrs. Bjarne Klaussen and Mrs. Ralph A. Blanchard: 4 brothers, Elon Huntington Hooker, H. M. Hooker, Willard Hooker and Paul Hooker, and 2 sisters, Miss Margaret Hooker and Mrs. E. Maurice Trimble.

Dean of the Dyestuff Industry

Adolf Kuttroff, 89, one of the outstanding figures in the dyestuff industry for more than half a century, a director of General Dyestuff, died Mar. 23rd. Born in Salz, Wuerttemberg, Germany, Mr. Kuttroff came to this country in 1860 and entered the business of Adolphus Keppelman, importer of dyestuffs and textiles, and became American agent for A. Poirrier, a leading French dyestuffs manufacturer. With William Pickhardt, he founded Pickhardt & Kuttroff, which represented Poirrier until 1876, and also acted as American agent for Badische. Mr. Pickhardt died in 1894, but the firm continued for a time. Karl Pickhardt, a brother of the founder, joined the organization in 1900, when it was incorporated, and the firm subsequently became Continental Color & Chemical and later the Badanese Co. of New York. This company was liquidated in 1917, but the heads of the business continued under the name of Kuttroff, Pickardt & Co., and in 1925 the General Dyestuff Corporation was founded, with Mr. Kuttroff chairman of the Board of Directors. He retired from business in '26, but remained as a director of the corporation.

Mr. Kuttroff was interested in numerous philanthropic institutions, and was a member of many German Clubs. His wife, whom he married in 1872, died in 1904. Surviving are 3 sons, Edwin Kuttroff, Arthur Kuttroff, and Percy Kuttroff, and 3 daughters, Mrs. Lilly Brunn, Mrs. Bertha Ruckgaber, and Mrs. Clara Cassaber.

U. S. Dye Pioneer

Dr. George A. Prochazka, 80, a chemist who had a major part in developing the U. S. dye industry, died Mar. 24th.

Born in Milwaukee, Dr. Prochazka was educated in N. Y. private schools and in 1868 went abroad to study at the Koeninglrealgymnasium at Wiesbaden and at the laboratory of Fresenius. Subsequently he went to Heidelberg. In 1874 he was awarded the degree of doctor of philosophy summa cum laude. He then studied at the University of Bonn and at Aachen Polytechnic.

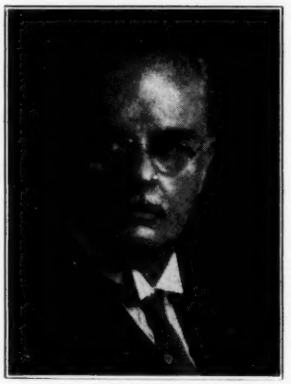
On his return to this country Dr. Prochazka was connected with Stevens Institute as assistant to Albert R. Leeds, then became a partner of Herman Endemann, analytical and consulting chemist, served as chemist to the Tartar Chemical Co. of Jersey City, and created the dyestuffs department of Heller & Merz.

He worked out methods for the manufacture of magenta, eosines and other colors, also the successful rationalization of ultramarine manufacture, and in 1893 became general manager of the company's factories. During this period Dr. Prochazka assisted the Tariff Commission in formulating the legislation necessary for the development of a self-contained American dyestuffs industry.

In 1898 Dr. Prochazka and his brother, the late John Prochazka, established Central Dyestuff & Chemical of Newark. Dr. Prochazka retired from active business 12 years ago. He was a lover of music and an accomplished pianist.

Last of the Old R. & H. Guard

William Augustus Hamann, 75, former president and chairman of the board of R. & H., now the R. & H. Chemicals Division of du Pont, died on Mar. 24th. Born in Hoboken, Mr. Hamann went to



the Hoboken Academy, and at the age of 15 obtained a position with Frietzsche Brothers. Later he became agent in N. Y. City for Seely Manufacturing, Detroit, perfumery, and Lloyd Brothers, Cincinnati, fluid extracts. In 1885 he went with R. & H., and then, through his 45 years' connection with the company, became successively secretary, treasurer, vice-president, president, and chairman of the board in '28; retiring in '31. He was also, at various times, president and director of several subsidiaries of the company, and was vice-president and treasurer of Bakelite. He was treasurer of the Drug & Chemical Section of the New York Board of Trade and Transportation for 25 years; treasurer of the Chemists' Building Company to the time of its being taken over by the Chemists' Club.

Dies After Relapse

John D. Billings, 37, assistant secretary of William S. Gray, on Mar. 29th, following an operation for acute appendicitis. He was reported at one time out of danger. Mr. Billings started with the Gray organization in '14 as an office boy at the age of 15. For several years he headed the methanol department and was made assistant secretary in '34. He is survived by his widow and 2 small daughters.

Young Wood Chemical Leader

Thomas Francis Connelly, Jr., 42, prominent in the wood distillation industry and a son of the late T. F. Connelly,

Sr., on Mar. 19th. He was manager of Genesee Chemical, and of Oswayo Chemical of Coneville, Pa. He was also director of Manufacturers Charcoal. After the death of his father he was made president of Genesee Chemical, and vice-president of Oswayo.

International Perfume Authority

Leon Givaudan, founder and president of Givaudan-Delawanna, N. Y. City, at his home in Neuilly, Paris, France, on Mar. 25th. Since his founding of the company nearly 40 years ago, Mr. Givaudan has seen it expand to international proportions under his leadership.

Other Deaths Last Month

Mrs. Lucy G. Magnus, 72, mother of Percy Magnus, president of the N. Y. Board of Trade and president of Magnus, Maybee, and Reynard, N. Y. City essential oil house, on Mar. 23rd.

James A. Evans, 63, head of Erie Laboratories, Erie, Pa., and a high ranking official in the Masonic Order, on Mar. 3rd.

Robert E. Lee Correll, 68, general superintendent of a chain of cottonseed mills in North Carolina, on Mar. 9th, of a heart attack.

Fred A. Howard, 82, leather chemist, and known as the "trouble man" for the shoe and leather industries, on Mar. 17th at his home in South Easton, Mass.

William Bachman Chisolm, a prominent figure in the phosphate rock industry, on Mar. 7th.

Dr. Alfred Edgar MacIntyre, 72, a Canadian chemist who attained international repute during the World War, on Mar. 13th.

J. B. Cleaver, well-known animal and vegetable oil broker (Snow & Cleaver, N. Y. City), on Mar. 22nd.

Dr. Adolf O. Grynkraut, well-known leather chemist, on Mar. 28th.

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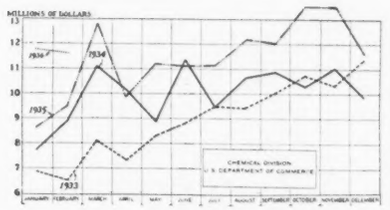
3 Dimensional Movies

What may very likely develop into the most sensational development in the moving picture industry since the introduction of the "talkies," 3 dimensional pictures, was demonstrated before the "Symposiarchs" at a meeting held at the Chemists' Club on Mar. 25th. Youthful inventor, E. H. Land of the Land-Wheelwright Laboratories, Boston, was the guest speaker and, in addition to showing the new movies, discussed and demonstrated the application of Polaroid, the new light polarizing glass, to the elimination of head light glare, strain testing, architectural illumination with interference colors, etc. One of the most interesting applications is the development of glass which will permit persons to look out of windows but will not permit those on the outside from seeing in.

February Chemical Exports Reach $11,651,000

All Classifications Share in Increase — Foreign Dyes Sales Brisk—Naval Stores Surprisingly Show Export Gains—Mexican Chemical Market Possibilities Analyzed—Canada Our Best Soap Customer—

Foreign demand for American chemicals and related products continued very active in February, total value of such sales being recorded at $11,651,000, according to C. C. Concannon, Chief, Commerce Dept.'s Chemical Division. This compares with export shipments valued at $9,444,000 during the corresponding month of last year, $8,870,000 in February, '34, and $6,474,000 for February, '33.



Trend of U. S. exports of chemicals graphically displayed.

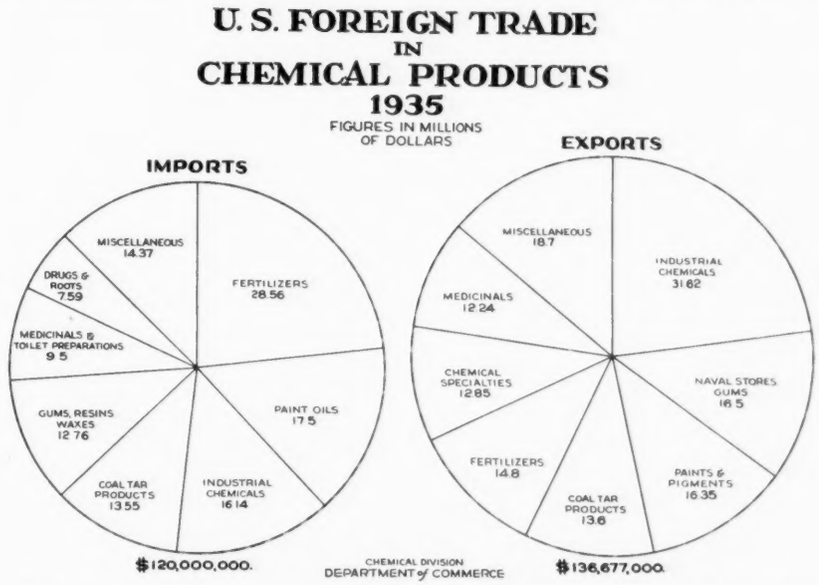
Every major classification shared in the stimulated foreign demand during February, particularly sulfur, coal tar products, including dyes, medicinals, paint products and fertilizers. Fertilizer exports increased to a total of 150,000 tons during the month compared with 92,846 tons in February, '35. In this group phosphate rock shipments increased from 77,000 tons to 105,000 tons; nitrogens from 10,646 tons to 36,326 tons; potash from 1,569 tons to 6,213 tons.

Exports of naval stores were well maintained, total aggregating $1,180,800 in value during February, an amount slightly in excess of those for February, '35. In this group, however, demand for rosin was weak, amounting to only 87,230 bbls. compared with 97,222 bbls. in February last year, while exports of turpentine increased from 416,430 gals. to 629,000 gals.

Export demand for American paint products continued active, foreign shipments being valued at $1,396,500 in February compared with $1,136,560 for the corresponding month of last year, increase being due to heavier shipments of all classes of ready mixed paints, varnishes and lacquers, and to a better demand for pigments, particularly carbon black.

Other increases recorded in February compared with February last year included chemical specialties which increased in value from $1,045,600 to $1,272,450; industrial chemicals from $1,757,800 to $1,768,600; essential oils from $157,500 to $210,600; soaps from $136,800 to $182,800; and toilet preparations from $313,000 to $391,580.

American soap exports touched the lowest level recorded in recent years during '34, but recovered substantially in '35, increasing 15% in quantity and 22% in value. Total exports of all classes of soaps aggregated 27,120,000 lbs., valued at $2,583,600, in '35, compared with 23,541,000 lbs., valued at $2,108,400, for the preceding year. Practically every type of soap entering into export trade during '35 shared in the gain, particularly toilet



Exports of sulfur were also heavy during the month and totalled 51,500 tons, valued at $1,025,921, compared with 25,439 tons, valued at $493,300 in February, '34.

Foreign demand for American dyes, colors, stains and color lakes was especially brisk in February. Total shipments of such products amounted to 2,124,000 lbs. compared with 1,077,400 in February last year, value increasing from $391,650 to $656,400.

soaps of the better grades, and American soap of one kind or another was sold to every country of the world during the year, analysis of statistics shows.

Canada is our outstanding foreign market for soaps, followed in order of importance by the Philippine Islands, British India, Panama, China, Haiti, and South Africa. Philippine Islands, British India and Panama are outstanding as customers for American toilet soaps and Canada, Haiti, and Dominican Republic are our largest foreign outlets for laundry soaps, according to the Commerce Dept.

Mexican Domestic Production

The important Mexican chemical market has changed considerably since 1930, occasioned principally by the increased local production of certain chemicals and allied products. In a number of instances the importation of finished chemical items has been severely reduced because of domestic manufacture, while on the other hand chemicals used in the manufacture of such products are in greater demand. The future tendency of this chemical market will depend upon the rapidity with which the domestic manufacturing chemical industry develops. The Department of Chemical Science of the University of Mexico is graduating about 50 well equipped chemists annually who enter or establish industries. So far as value is concerned, the U. S. occupies an important place as an exporter of chemical products to Mexico and supplied more than half the total importations of chemicals and allied products valued at $10,000,000 in '34. Other foreign countries such as Germany, United Kingdom, and to a greater extent in '34 and '35 than formerly, Japan, figure prominently in the trade.

Palestine Potash Reported Cooperating With Cartel

While Not Officially a Member It Will Sign "Gentlemen's Agreements"—German Potash Sales at All-Time Peak—Latest Chemical Developments Abroad Discussed—

While the Palestine Potash Co. has not joined the international potash cartel, due, it is said locally, to legal technicalities, it has indicated its willingness to sign "gentlemen's agreements" for short periods which in effect serve the same purpose as membership in the cartel, according to reports from Paris, made public by the Commerce Dept's Chemical Division. Although the potash output of Palestine is small, production costs are low due to the unusual method of exploitation. The bulk of the amount recovered is sold to domestic consumers, with small amounts going to nearby countries.

Potash Sales, 1,320,000 Tons

Sales of potash fertilizer salts by the German Potash Syndicate attained an all-time peak last year, reaching 1,320,000 metric tons potassium oxide content, compared with the depression low of 847,000 tons in '32, according to reports from Germany made public recently by the Commerce Dept. Chemical Division. Gain in '35 was 8% over the preceding year, which in turn was 30% higher than in 1933. Domestic and foreign sales of potash both shared in the 1935 gain, the former increasing about 8% to 930,000 tons, compared with the preceding year, thus for the first time surpassing the 1928 peak of 870,000 tons, and the latter likewise expanded approximately 8% to around 390,000 tons, the report states. The actual weight of exports exceeded 1,050,000 metric tons.

Total world potash consumption increased approximately 10% last year to a new peak of between 2,250,000 and 2,300,000 metric tons compared with a gain in world consumption of 30% in '34 and 20% during the preceding year.

Germany Controls Drying Oils

With the view to insuring an adequate quantity of linseed oil for commercial purposes, Germany's entire supply of drying oils was placed under Government supervision on Mar. 1. New measure provides that linseed oil may be used only for exterior surfaces where synthetic substitutes would not be satisfactory. To meet consumption requirements for other purposes, such as interiors, where pure linseed oil paints and varnishes are necessarily required, an entirely new synthetic product known as "El-Varnish" will be supplied. This substitute is understood to contain about 30% pure linseed oil mixed with a synthetic ingredient.

A national linseed oil quota of 8,000 metric tons has been established for the last 10 months of the current year, and consumption of "El-Varnish" is expected to reach 40,000 metric tons.

Other Foreign Developments

The French naval stores industry continued to suffer last year despite substantial government assistance to exporters. Turpentine exports declined 58% from shipments to foreign countries during '34, and rosin declined more than 37%, according to a report from Bordeaux. In general, however, the naval stores industry was believed to be in a better position at the end of the year than the wine or other French agricultural enterprises.

Germany's production of synthetic resin attained a new peak of around 25,000 metric tons last year, compared with 17,000 tons in '34, according to advices from Frankfort-on-Main. More than 20% of the '35 output was exported.

With the outstanding exception of France, practically all of the world's leading agricultural countries consumed more fertilizers during '35. French agriculturists reduced consumption of practically all types of fertilizer materials, particularly nitrogens and phosphates, a report from Paris states. Purchases of nitrogens declined approximately 20% during '34-'35 compared with the preceding crop season, despite a price reduction of 4% in January '35 and a further cut of 10% in July. A report from Tunis states that France and its colonies purchased only 380,491 metric tons of Tunisian phosphate during '35, compared with 637,387 tons in '34, or a decline of approximately 40%.

An advance estimate of ammonium sulfate production in Japan during '36, made by a trade association, places it at 920,000 metric tons for association companies and 465,000 tons by outsiders, including concerns in Korea and Manchuria, or a total of 1,385,000 tons. Carry-over from '35 is placed at 45,000 tons, imports from the U. S. 13,000 tons, and from the European cartel 125,000 tons, giving a total supply of 1,568,000 tons. Consumption during the year is estimated at 1,305,000 tons and exports at 50,000 tons, leaving a surplus at the end of the year of 213,000 tons. More conservative estimates place production at a lower figure with stocks at the year-end at about 100,000 tons.

Litigation

¶Government Files Answer on Coconut Oil Tax Suit—Diversey Corp. Patents Infringed—

Authority of the District of Columbia Supreme Court was challenged by Government counsel on Mar. 23rd as Haskins Brothers & Co., Omaha soap manufacturers, petitioned Justice Jennings Bailey for a restraining order preventing payment of coconut oil excise tax collections to the Philippine Commonwealth.

Asserting that the company's plea for a permanent injunction restraining Treasury Dept. collection of the tax constituted suit against the U. S., Andrew D. Sharpe, special assistant to the Attorney-General, moved for dismissal of the petition outright. Justice Bailey agreed to take the case under advisement. At the same time he extended a temporary restraining order which he granted some months ago.

U. S. District Court for the Northern District of Illinois, Eastern Division, has handed down a decision in favor of Diversey Corp., holding patents Nos. 1,734,706 and 1,962,821 valid and infringed. Defendant was L. Carlton Mertz, doing business as the L. Carlton Mertz Co.

Officials of Diversey state that the patents, which were declared valid and infringed, cover the composition and

method for its product, "Protex Metallum," a non-corrosive, alkaline detergent, used in the dairy, baking and metal-cleaning industries.

Cereal Chemists Meet

Midwest Section, American Association of Cereal Chemists, held their regular monthly dinner meeting at the Electric Club, Civic Opera Bldg., Mar. 2nd, when Dr. T. F. Gallagher, Department of Bio-Chemistry, University of Chicago, spoke on, "Some Biological Effects of Sterol Metabolism."

COMING EVENTS

American Chemical Society, 91st Meeting, Kansas City, Mo., Apr. 13-17.

American Petroleum Institute, Division of Production, Pacific Coast District, Annual Spring Meeting, Los Angeles, Cal., Apr. 14.

American Institute of Mining and Metallurgical Engineers, Open Hearth Conference, Detroit, Mich., Apr. 16-17.

National Petroleum Association, Semi-Annual Meeting, Cleveland Hotel, Cleveland, Apr. 16-18.

American Water Works Association, Montana Section, Helena, Mont., Apr. 17-18.

Midwest Engineering and Power Exposition, Chicago, Apr. 20-24.

New England Water Works Association, Hartford, Conn., Apr. 21.

Electrochemical Society, Spring Meeting, Cleveland, Ohio, Apr. 23-25.

U. S. Chamber of Commerce, 24th Annual Meeting, Washington, D. C., Apr. 27-30.

American Gas Association, Natural Gas Dept., Annual Meeting, Dallas, Tex., May.

6th National Premium Exposition, Palmer House, Chicago, May 4-8.

Tanners' Council of America, Spring Meeting, White Sulphur Springs, W. Va., May 7-8.

American Institute of Chemists, Annual Meeting and Medal Presentation, Buffalo, N. Y., May 9-10.

American Petroleum Institute, Mid-Year Meeting, Mayo Hotel, Tulsa, Okla., May 13-15.

Natural Gasoline Association of America, Mayo Hotel, Tulsa, Okla., May 13-15.

Refrigerating Machinery Association, Spring Meeting, Hot Springs, Va., May 14-16.

Air Conditioning Manufacturers' Association, Annual Meeting, Hot Springs, Va., May 16.

International Petroleum Exposition and Congress, Tulsa, Okla., May 16-23.

American Gas Association, Production and Chemical Conference, N. Y. City, May 25-27.

National Association of Purchasing Agents, Inform-A-Show, New Orleans, La., May 25-28.

American Electro-Platers' Society, Annual Convention, Cleveland, Ohio, June 1-4.

American Association Cereal Chemists, Annual Meeting, Adolphus Hotel, Dallas, Tex., June 1-5.

National Sanitary Supply Association, Annual Meeting, Hotel New Yorker, N. Y. City, June 3-5.

American Water Works Association, Annual Convention, Biltmore Hotel, Los Angeles, Cal., June 8-12.

American Society of Mechanical Engineers, Dallas, Tex., June 17-20.

Chemical Engineering Congress, Central Hall, Westminster, England, June 23-27.

American Society for Testing Materials, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 29-July 3.

American Chemical Society, Semi-Annual Meeting, Pittsburgh, Sept. 7-12.

American Gas Association Convention, Atlantic City, N. J., Week of Oct. 26.

American Association Textile Chemists and Colorists, Annual Meeting, Providence, R. I., Dec. 4, 5.

"Achema VIII," Plant exhibition, in connection with 50th General Meeting of Verein Deutscher Chemiker, Frankfurt, Germany, Sept., 1937.

LOCAL*

Apr. 13. A.C.S., North Jersey Section, Winfield Scott Hotel, Elizabeth, N. J.

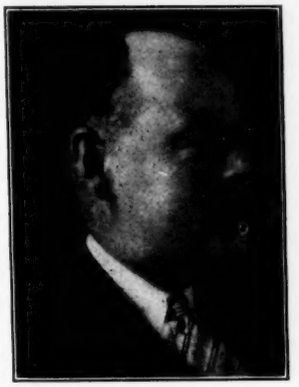
May 8. N. Y. Section, A.C.S., Joint meeting with N. Y. Section, Society of Chemical Industry; A.C.S. in charge.

* Meetings held at Chemists Club unless otherwise noted.

Haskell Heads Salvation Army Drive

Accepts Chairmanship of Chemical and Paints Division—Bogert to Receive A. I. C. Medal—German Superphosphate Makers to Visit U. S.—Other Personal News of the Past Month—

Glenn I. Haskell, 1st vice-president of U.S.I., will act as chairman of the chemicals and paints division of the '36 Citizens Appeal for the Salvation Army.



U. S. I'S GLENN HASKELL.
Lends his executive talents to raising funds for charity.

Fraser M. Moffat, vice-president of U. S. Industrial Chemical, will serve as vice-chairman of this division. The chemicals and paints group of the campaign is one of 65 similar ones now being organized among various trades and industries to raise a goal of $500,000 for those institutions of the Army that are not self-supporting.

A. I. C. Meeting May 9-10

Dr. Marston T. Bogert, Columbia professor of organic chemistry, will receive the American Institute of Chemists' medal at the annual meeting to be held in Buffalo May 9-10 for "outstanding service" as a teacher and as an investigator in the field of organic chemistry. Dr. Bogert has been a member of the faculty of Columbia since '04. He is a former president of the A. C. S. and of the Society of Chemical Industry in England, winning the Nichols Medal of the latter organization in '05. Foreign governments, universities and scientific organizations have awarded him decorations, medals, degrees and honorary memberships.

To Study U. S. Methods

A party of 10 or 12 German superphosphate manufacturers will arrive on Apr. 24 and will return on May 13. Leader of the party will be Dr. P. C. Kruegel, Secretary of the International Union of Superphosphate Manufacturers and Director of their Experiment Station at Hamburg. While in this country, the party will visit a number of superphosphate plants at Carteret, N. J.; Baltimore, Md.; Savannah, Ga.; and Tampa, Fla. They will also visit 2 or 3 State experiment stations, the Association offices in Washington, the Dept. of Agriculture laboratories, and the phosphate mines in Florida.

Other Names in the News

H. L. Derby, Cyanamid & Chemical's president, will speak before the Joliet Chamber of Commerce sometime in April. Cyanamid is planning important additions to the Joliet plant.

Elon H. Hooker, told Los Angeles reporters last month, "There is no good reason why the artificial silk industry, husky industrial baby of present-day America, should not be located on the Pacific Coast." He expressed the belief that the Pacific has a great future; that our trade will be with the Orient and South America, rather than with Europe. His company, Hooker Electrochemical, operates a caustic plant at Tacoma.

Percy C. Kingsbury, General Ceramics, will speak on ceramics as a chemical engineering material at a symposium of the North Jersey Section of the A.C.S. on Apr. 13th. Meeting will be held at the Winfield Scott Hotel, Elizabeth. Mr. Kingsbury will go abroad in May for an extended trip through Germany, France and England.

Francis C. Flint, chief chemist, Hazel-Atlas Glass, will lead the American Ceramic Society this year.

The Phosphate Rock Institute is closing the N. Y. City offices. Future communications should be addressed to John T. Burrows, president, Phosphate Rock Institute, 61 Bway, N. Y. City.

Dr. C. M. A. Stine, duPont's research director, was at Miami Beach last month with Mrs. Stine and their daughters, Barbara and Betty. Dr. Stine is scheduled to make one of the 2 principal addresses at the opening session of the spring meeting this month of the Farm Chemurgic Council in Dearborn, Mich.

Percy C. Magnus, president of the N. Y. Board of Trade and of Magnus, Mabee & Reynard, addressed the Sales Executive Club at the Roosevelt on Mar. 16th on the subject of "The Sales Executive Looks at Government."

Williams Haynes, publisher of CHEMICAL INDUSTRIES, was the guest speaker of the Chemical Club of Philadelphia at its regular monthly meeting held on Mar. 24th at the Manufacturers' and Bankers Club.

Jos. H. Bennis, vice-president and sales director of New York & New Jersey Lubricant Co., has just returned from a 6 weeks' tour of South America.

Sydney R. David, New England manager for Sandoz Chemical, has been spending a vacation in Florida. He left Boston the early part of March.

Hercules and Atlas Hold Annual Elections

International Nickel Promotes Thompson, Merica, MacAskill and Evans—Klinkenstein Elected Maas & Waldstein Vice-President—Johnstone Placed in Charge of Merck Operations with Title of Vice-President—Other Personnel Notes—

R. H. Dunham, president, Hercules Powder, after the annual organization meeting of the Board of Directors on Mar. 25th, announced the election of the following officers and members of committees for the ensuing year: R. H. Dunham, chairman of the Board and president; C. A. Higgins, J. T. Skelly, T. W. Bacchus, C. D. Prickett, G. G. Rheuby, L. N. Bent, vice-presidents; C. C. Hoopes, treasurer, E. B. Morrow, secretary. Executive committee: R. H. Dunham, chairman; L. N. Bent, C. A. Higgins, C. C. Hoopes, G. G. Rheuby, and J. T. Skelly; Finance Committee: J. T. Skelly, chairman; R. H. Dunham, C. A. Higgins, C. C. Hoopes, C. D. Prickett, and G. G. Rheuby.

At the Atlas Powder annual meeting of stockholders, the following directors were elected: C. F. Backus, Ernest duPont, Isaac Fogg, Leland Lyon, E. W. Maynard, W. T. Penniman, Leonard Richards, J. F. Van Lear, and Charles Warner.

Atlas Powder stockholders voted last month to amend the certificate of incorporation of the company to provide a definite method for determining the price for which no par value common stock can be issued, and to make available 20,000 shares of the unissued no par value common stock for sale to employees from time to time.

International Nickel Elects 4

Dr. John F. Thompson, formerly sole vice-president of International Nickel, has been appointed executive vice-president. Dr. Paul D. Merica, formerly assistant to the president, Donald MacAskill, general manager in charge of Canadian operations and D. Owen Evans, delegate director of the Mond Nickel Co., Ltd., have been appointed vice-presidents.

Maas & Waldstein's New Set-Up

Directors of Maas & Waldstein (lacquers and lacquer enamels) re-elected as president M. A. Maas, who has held that position for 11 years. Gustave Klinkenstein was elected vice-president and general manager, R. F. Magnus was elected treasurer, and B. D. Sanderson was reappointed sales manager. Mr. Klinkenstein, who now assumes the general management of the company, has been associated with it for over 20 years. He began work as a chemist, and later became chief chemist, and recently, director of research. Mr. Klinkenstein is thoroughly familiar with all phases of his company's work and is well known in the finishing field. R. F. Magnus has been with the company for 8 years. He is the son of the late Frederick S. Magnus, who was treasurer of Maas & Waldstein since '14. He is fully conversant with the duties of his new office as he worked in close cooperation with his father for many years.

Johnstone Moves Up

Henry W. Johnstone, Merck Rahway plant manager, was appointed a vice-president of the corporation in charge of operations at a directors' meeting held at N. Y. City recently. Coming to Merck

MERCK'S HENRY W. JOHNSTONE.
He is now Vice-President Johnstone.

6 years ago, Mr. Johnstone served as assistant to the executive vice-president and organized the Merck planning department.

He was graduated from Yale in '16, and after a year of teaching at Middlesex School entered the army as a private. He served 20 months in France and was demobilized as a 1st lieutenant, following which he was associated for 10 years with Colgate & Co., serving as associate manager of the West Coast plant at San Francisco, manager of the Mid-West plant at Chicago, and general traffic manager at the Jersey City main office. He resigned in '29 to join the Brookmire Economic Service, re-entering the chemical field with Merck. His home is at Delwick Lane, Short Hills, N. J. He is married and has 2 children.

Others in New Positions

Dr. C. W. Morse, instructor in analytical chemistry at Cornell, has resigned and accepted a position with Bull & Roberts, consulting chemists, N. Y. City.

Edwin A. Robinson, who for several years was in charge of development work with Tennessee Eastman, is now connected with National Oil Products, Harrison, N. J.

Fred E. Stuart, who for the past 5 years has served Industrial Chemical Sales as research engineer in the water purification field, resigned effective Mar. 15th, in order to direct the activities of Activated Alum Corp., in the water purification and sewage treatment fields.

Joseph E. Moore is the new Southern Calco sales manager, succeeding John L. Crist who is now president of Southern Chemical. Mr. Moore has been associated with Calco's Charlotte branch since '30.

Nelson S. Landis, 504 Southern Ohio Bank Bldg., 519 Main st., Cincinnati, is now agent for the Lavanburg line of colors in Cincinnati and Louisville.

Harry M. Brown, who was formerly connected with the O. Hommel Co. of Pittsburgh, has joined the sales organization of Patterson Foundry & Machine at East Liverpool, Ohio.

James A. Baggs is Southern States Phosphate & Fertilizer president. He has been with the company 25 years. I. W. Reed is now board chairman.

W. B. Wiegand is now Columbian Carbon's director of research. He will continue to keep close contact with Binney & Smith.

T. S. Grasselli and J. M. McCoy were elected members of the du Pont executive committee on Mar. 16th. Other officers were reelected.

Alfred Kauffmann, a former Link-Belt president, again heads that organization following the resignation of George P. Torrence.

Washington

¶MCA Opposes Lonergan Water Pollution Bills — Status of the Copeland Bill Uncertain—

The Manufacturing Chemists Association's opposition to the Lonergan Water Pollution bills, S 3958 and S 3959 was voiced by Sheppard T. Powell on Mar. 24th before the Subcommittee of the Senate Committee on Commerce. While insisting that the Association was in entire sympathy with the general idea of preventing water pollution caused by industrial wastes, Mr. Powell insisted that there was no need for Federal regulation; that the matter was one that could be better handled by the individual states. He also pointed out that at present there were in many cases no practical methods available to employ.

The Copeland Pure Food and Drug Bill does not stand a chance of getting through the Congressional jam, but a more drastic measure will be drafted for the next session, is the latest report from Washington. In some quarters it is being said that industry has made a grave mistake in not lending sufficient support to the present measure to get it through, and

that in its place a less acceptable measure will be forced on the manufacturers.

F. T. C. Rulings

The Federal Trade Commission has ordered Milton Toch, 1847 68th st., Brooklyn, trading as Universal Ink Co. and engaged in the sale of liquid and powdered ink, to discontinue representing that his business was established prior to 1934, or that he is a manufacturer of powdered ink. The respondent admitted the material allegations of the complaint to be true and did not contest the proceeding.

A complaint alleging unfair competition in connection with the sale of paint, varnish, enamel and allied products, has been issued by the Federal Trade Commission against Davis Paint, Kansas City, and 8 of its subsidiaries.

Tariffs and Customs

United Kingdom, by Treasury order, has removed the general tariff of 10% ad valorem from oxalic and now permits its entry duty free.

France, in agreement with the U.S.S.R., has placed chromate of soda and bichromate of soda on the list of goods which may be imported under the minimum tariff within certain quotas.

The Tariff Commission has denied and dismissed without prejudice an application for investigation of production costs of formic, looking toward a decrease of duty. Application was filed by R. W. Greeff & Co.

Traffic

The I. C. C.'s last-minute suspension of railroad plans for freight pick-up and delivery service will be protested by the leading business concerns of the East. The trucking industry led the demand for the suspension.

Freight car loadings in the 2nd quarter of '36 are expected to be about 9.5% above actual loadings in the same quarter of '35, according to the 13 shippers' regional advisory boards. Estimates on chemicals and related products are as follows:

Commodity	Carloadings—Actual 1935	Carloadings—Estimated 1936	Estimated Increase
Petroleum & petroleum products	462,298	487,973	5.6%
Fertilizers, all kinds	78,024	80,686	3.4
Chemical & explosives	19,951	20,744	4.0

Next session of the hearing before the I. C. C. in Washington on the petition to extend the emergency freight charges (ex parte No. 115) will be held on Apr. 21 at 10 A. M., before Commissioner Aitchison. A hearing is scheduled at Boston, Mass., Apr. 16, 10 A. M., at the Hotel Lenox.

March Chemical Tonnages Show Seasonal Gains

Volume is Less Than Expected as Floods Cover Important Industrial Centers—du Pont Reduces Methyl Chloride 5c—First Quarter Sulfur Sales Higher—Tin Restriction Scheme in Jeopardy—

Increased activity in the industrial chemical division was reported from several quarters last month. Seasonal improvement in many of the process industries, plus the heavy demand for chlorine, bleaching powder, copperas, alum and other water treatment chemicals, brought the March volume considerably above the totals for either January or February. Some interruptions in production occurred in certain of the flood areas, but shipments were easily taken care of from stocks at other points. Relatively few chemical consuming plants were damaged, although at one or 2 points in the New England textile area several factories stopped operations. Havoc wrought by the floods will undoubtedly supply additional impetus to the seasonal improvement in many industries using industrial chemicals, such as the paint, glass and textile fields.

Steel operations, despite some curtailment because of the floods, reached last month the highest ratio of activity since June, '30. Automobile production increased considerably too, with the month's total well above the 250,000 mark.

March alkali tonnage exceeded February's by a slight margin, but shipments into some consuming industries are still below normal. Weakness in the price structures of caustic and trisodium phosphate continues unchanged. On the other hand, spot stocks of sodium silicofluoride were low and quotations were advanced. The R. & H. Division of duPont announced a 5c reduction on methyl chloride, effective Apr. 1.

Although March volume was definitely improved over that recorded for either of the 1st 2 months of the year it did not reach the proportions expected by most producers. March is usually one of the 2 best tonnage months of the year. Reasons assigned for failure to expand as much as was hoped for are: uncertainties over the domestic and foreign political situations which keep buyers from increasing forward commitments and instead hold them to "hand-to-mouth" purchasing; the flood disasters; and the severity of the past winter. The last 2 causes are but temporary and should add to the "backlog" of future orders. Chemical producers now feel that this year April will be a banner tonnage month.

Sulfur sales in the 1st quarter of this year, stimulated by unusually large exports and generally good domestic business, have been running materially ahead of the like '35 period, and at about the same level as the final quarter of last year, according to reliable reports.

Important Price Changes

ADVANCED

	Mar. 31	Feb. 29
Sodium silicofluoride	$0.05¾	$0.05¼

DECLINED

Acid stearic	$0.09	$0.10
Tin crystals	.36	.36½
Tin metal	.47⅜	.48⅞
Tin tetrachloride	.24½	.24¾

DEPT. OF LABOR STATISTICS

	Feb.'36	Jan.'36	Feb.'35
Employment *a*	107.1	107.4	102.8
Payrolls *a*	99.9	99.7	91.0

DATA FOR PROCESS INDUSTRIES

	Feb.'36	Jan.'36	Feb.'35
Explosives:			
Employment *a*	88.6	86.8	89.3
Payrolls *a*	80.8	75.8	75.5
Soap:			
Employment *a*	96.4	97.1	102.1
Payrolls *a*	94.5	94.9	94.3

	Feb. '36	Feb. '35
Exports	$1,788,000	$1,698,000
Imports	1,712,000	1,152,000
Crude sulfur, exports	902,000	463,000
Indus. Chemical Specialties, exports	1,274,000	1,406,000

a 1923-1925=100.0.

Reports from Europe indicate that negotiations for renewal of the restriction of production of tin are meeting serious difficulties. With the price of tin now at a level where production is highly profitable, it is understood that some of the countries want increases in their quotas.

Construction

¶Monsanto Plans Additions to Anniston Works—Several Companies Announce Expansion Plans—

Monsanto, which owns and operates the plant of the former Swann Corp. at Anniston, Ala., plans physical developments this year which may be extensive.

Annual report of the company just issued, together with statement by the president, Edgar M. Queeny, to stockholders, tells of plans to purchase and operate to greater output phosphate mines with resultant lower costs of production of the various products.

No detailed statement is given out as to the planned development but it is understood that a considerable sum will be spent in bringing about wider diversification and distribution.

A comprehensive program is planned for '36, involving the acquisition of phosphate mines and reserves to secure and lower the cost of this important raw material. A plant to produce several new products that have passed through the development stage will be built and improved facilities for other operations will be constructed.

Plans Reported in March

Niacet Chemical, Niagara Falls, N. Y., has awarded contracts for a large addition to its general chemical manufacturing plant in that city.

Titanium Alloy Manufacturing, also of Niagara Falls, has awarded contracts for construction of a new furnace building at its plant.

Richard L. Cawood, president of Patterson Foundry & Machine, East Liverpool, Ohio, has announced the company's intention to spend immediately $100,000 in plant extensions. New addition is to be used in the manufacture of stainless steel equipment and other items made from special metals of all kinds.

DuPont and Carbide are acquiring additional properties in the immediate vicinities of their plants in the Charleston, W. Va. area, according to reports. Carbide is said to have a construction force of 1,000 on Blaine Island, erecting 3 structures, one of which will be used for Vinylite production. An addition to the power plant is said to be in the course of construction

Reilly Tar & Chemical will spend $100,000 on plant expansion at the Fairmount, W. Va., plant, under the direction of George F. Kucera, plant manager.

Companies

¶Du Pont Technicians Demonstrate New Oil Turbine Ultracentrifuge — Unlimited Magnesium Supplies — News of the Chemical Companies.

Representatives of the scientific press were guests of the du Pont Co., on Mar. 31st, at a demonstration of the company's new oil turbine ultracentrifuge recently installed at the experimental station.

The oil turbine ultracentrifuge, invented jointly by Prof. The Svedberg, of Upsala University, Sweden, and Dr. J. B. Nichols of du Pont, is a new tool for the research chemist so powerful that the normal force of gravity can be multiplied upwards of one million times.

Following a conference at 11 o'clock in the du Point building, the science editors and representatives of the du Pont chemical department and the publicity department joined in a luncheon in the Hotel DuPont. Group then adjourned to the experimental station and there witnessed the ultracentrifuge demonstration conducted by Dr. E. O. Kraemer and Dr. J. B. Nichols, research chemists of the station staff.

Heard and Overheard

Unlimited supplies of magnesium recovered from the ocean will develop many industrial fields, M. Henry Chesny of Marine Chemicals Co., Ltd., says in a report to the A. C. S., describing the successful production of the mineral from seawater at South San Francisco, Calif.

"There can be but little doubt," Mr. Chesny asserts, "that the ultimate source of magnesium compounds for large-scale consumption will be their production from seawater."

Ollie Haun, former district manager for D. H. Litter & Co., Inc., and well known in the chemical world through his activities in the A. C. S., has become a partner of the O. L. West Co., Philadelphia, according to an announcement by Olin West. Company will also be reorganized, and in the future will operate under the name of the West-Haun Co.

At the annual meeting of the stockholders of J. T. Baker Chemical, the following directors were elected: H. H. Garis, R. A. Clark, W. P. Fitzgerald, R. H. Willever, C. D. Davis and W. H. Walters.

The important part which the du Pont chemical industries are playing in the economic life of the nation will be presented on an increased scale at the du Pont Exhibit, Atlantic City, beginning with Spring. Exhibit has been enlarged and now consists of 6,000 sq. ft.

Pine Products Chemicals, Inc., is a new $300,000 Delaware charter (Colonial Charter Co.) to operate a wood distillation and chemical manufacturing business.

Penn Salt, through a subsidiary, the Wypen Co., will manufacture fish and vegetable oil compounds at the Tacoma plant.

Valdosta, Ga., Chamber of Commerce is trying to get the Nelio-Resin Corp. to erect a plant near that city.

Charles H. Stone, Inc., Charlotte, N. C., is charged with stream pollution in a suit brought by a Mrs. Lizzie Thomas, who alleges a loss of $3,000 through livestock poisoning.

New Hampshire Diatomite Co., Portsmouth, N. H., which took over the property formerly owned by American Agricultural Chemical, is about to begin operations. Much new machinery has already been installed and the company is awaiting the arrival of a classifier before manufacturing will begin.

Keery Chemical, of Hancock, N. Y., operating wood alcohol and acetate plants at Cadosia and Hazel, near Roscoe, N. Y., has entered upon the production of ethyl acetate.

Du Pont Viscoloid has been granted a license by Catalin to manufacture and sell cast phenolic resins under Catalin's U. S. patents Nos. 19,708 and 19,710.

Cyanamid has acquired 4500 acres of phosphate property southwest of Fort Meade, Fla., and will erect a mining, washing and drying plant to cost about $250,000.

Chemical Lime, Bellefonte, Pa., is being reorganized upon the receipt of a $500,000 loan from the R. F. C. A new plant is to be built and several additional properties acquired.

The Cohn, Hopkins, Inc., San Diego, Calif., is erecting a $30,000 plant to extract fish oils and fish meal.

Pontiac Varnish has completed a new addition costing $30,000. C. H. Hutchins, president, reports business close to the '29 level.

In New Locations

U. S. Stoneware, after being 15 years at 50 Church st., N. Y. City, is moving the general sales offices directed by Sales Manager Howard Farkas to the Lincoln Bldg., 60 E. 42nd st.

Roots-Connersville Blower's Chicago office is in the Marquette Bldg., 140 S. Dearborn st., with Wm. Townsend in charge.

Hercules' new N. Y. City offices are located at 22 E. 40th st.

Dow Chemical is supplying gratis Dowmetal instrument cases and supports for the Harvard solar expedition to Siberia.

Carus Chemical, LaSalle, Ill., manufacturer of permanganates, is enlarging warehouse facilities.

News from the Plants

Pioneer Asphalt, Chicago, is expanding its plant at Lawrenceville, Ill., to take care of steadily increasing demands for the various items in its line of asphalt products. Both new construction to provide for increased tonnage requirements and considerable rehabilitation of present buildings and equipment were undertaken during the past winter to prepare for the anticipated increase in demand for asphalt products during the late spring and summer months. The Pioneer Asphalt is owned and operated by Wishnick-Tumpeer.

Titanium Pigment's Niagara Falls plant has ceased operation and the personnel has been transferred to the company's manufacturing units at St. Louis, Mo., and Sayreville, N. J.

A new Rademaker Chemical Co. well, 1st to be drilled in an expansion program that will greatly increase production of the bromine plant, has been completed.

Michigan Chemical's plant at St. Louis, Mich., is expected to be ready Apr. 15th.

Buildings, consisting of the power house, vacuum pan house, salt warehouse, and the bromine and bromides plant and warehouse are near completion.

Roane Iron & Coal's closed plant at Chattanooga may be turned into a solid carbon dioxide plant by Russell Engineering, Detroit.

Four Calco workmen were injured Mar. 10th, in an explosion.

Domestic and Foreign Cresylic Prices Advanced

Crude Naphthalene Shortage Continues with Prices Nominal—Broader Demand for Coal Tar Solvents—Dye Makers Take Heavier Intermediates Shipments—Coke Production Gains—

Cresylic acid and crude naphthalene continued to feature the coal tar markets last month. Both importers and domestic producers of the former stepped up quotations sharply, while the latter was advanced another 50c. Stocks of both are scarce with the outlook for any improvement in the immediate future not particularly bright.

Important Wax Price Changes

ADVANCED

	Mar. 31	Feb. 29
Acid cresylic, imp.	$0.63	$0.58
Dom.	.51	.58
Naphthalene, crude	4.00	3.50
Orthodichlorbenzene	.06½	.05½

DECLINED

None.

While Germany's export embargo on crude naphthalene has eased somewhat, the domestic supply continues uncertain and confusion exists among foreign purchasers of this material as to the cause of the shortage. In former years Germany produced more naphthalene than could be consumed and considerable quantities were exported, particularly to the U. S. At present, however, it appears unable to supply the domestic demand in spite of the fact that production has increased rapidly in recent years.

Current shortage is said to be due to the greatly increased domestic demand, chiefly from the synthetic resin industry which uses large quantities of materials which are manufactured from naphthalene. Other factors contributing to the consumption expansion are increased dye production and the recent introduction of a new product known as "Alcydal" which is made from naphthalene. "Alcydal" is used as an ingredient in the new German linseed oil substitute. "El-Varnish" which is now required by law to be used in the manufacture of paints and varnishes for interior work. Reports regarding the large scale use of naphthalene in the production of a new type carbon pigment and for motor fuel hydrogenation purposes are not supported either by trade opinion or statistics, according to reports from Consul S. B. Redecker, stationed at Frankfort-on-Main.

Germany's naphthalene production has increased steadily in recent years and is estimated to have totalled approximately 66,000 metric tons in '35 compared with 60,000 tons in '34, 49,500 tons in '33 and 41,100 tons in '32. As Germany's domestic demand for naphthalene is expected to continue strong for some time to come it is likely that the export embargo, which became effective in December, last year, will continue, according to the Consul.

Shortage of cresylic, both domestic and imported, is definitely caused by the expansion in the synthetic resin field and resin manufacturers are really definitely concerned about the situation.

A broad demand existed last month for nearly all coal tar chemicals. Shortage of xylol, toluol and naphtha remained unchanged, for despite the small gains in coking operations, the call for solvents is more than offsetting this effect. Intermediates moved out in better volume, and the dyestuff markets were fairly active with prices generally firm.

U. S. imports of coaltar dyes, colors, and stains amounted to 212,798 lbs., valued at $274,010. These totals compare with 437,595 lbs., valued at $691,309, reported for January, '35.

Outlook for the steel industry at the beginning of the 2nd quarter is brighter than at any time in several years. Without any development to cause over-buying by consumers, such as existed in the 2nd quarter of '34, operations and shipments promise to show substantial improvement.

A sharp increase in rate of steel ingot production is indicated in the next few months, although after an early spurt this month the uptrend may be less spectacular. At the moment many major units are booking orders on a large scale.

A small gain marked coke production in February. Output of both beehive and byproduct coke amounted to 3,293,542 tons, or 114,412 tons per working day. This represents an increase of 2.2% in comparison with the January rate of 111,978 tons, and is 10.9% greater than the rate prevailing in February, '35. Output of byproduct coke for the 29 days of February was 3,141,042 tons, or 108,312 tons per day. Compared with January, February rate increased 1.5%, increase being shared almost equally by furnace and merchant plants. In spite of a 3.5% decline in the average daily production of pig iron during February, operations at coke furnace plants were 1.3% higher than in the preceding month. Beehive coke production continued to increase, the February rate of 6,100 tons per day being the highest since March, '34, when 6,200 tons per day was reported. There was a decided decrease in the volume of stocks on hand at byproduct plants at the end of the month, the total tonnage of 1,273,814 tons being the lowest on record since March, '29. Compared with January stocks, those for February showed a drop of 39.6%, bulk of which occurred at merchant plants.

Citric Acid Unexpectedly Reduced 1¢

Decline in Seasonal Items Noted—Alcohol Prices Weak—Schedule is Renewed—Glycerine is Advanced ½c in Tight Market—

Late in the month a definite decline in the call for seasonal pharmaceuticals was reported although the month's total sales in these items were very heavy. Lack of spot stocks is holding the mercury price at a firm level despite a thin market. With improved weather in domestic producing centers, a definite increase in stocks is looked for.

Alcohol prices have been repeated for the 2nd quarter but, according to reports, the market is very competitive. The glycerine price structure is holding up well. Bismuth and cadmium salts are firm, the direct result of the strong position of the respective metals.

Somewhat surprising was the lowering of the citric acid price structure by 1c. This is the lowest price that has prevailed for this item in years, and the reduction comes at the period of the year when consumption picks up. The direct cause was the competitive state existing among the producers. Sodium and potassium citrates were reduced shortly after the acid reduction was announced. On the "up" side of the market santonin was advanced $2.50. Strychnine is firm and the Government is said to have bought 41,000 ozs. for rodent control. Venice turpentine was advanced 2c early in the past month.

Important Price Changes

ADVANCED

	Mar. 31	Feb. 29
Mercury	$78.00	$77.00
Methyl cinnamate	3.35	3.00

DECLINED

Acid citric	$0.27	$0.28
Alcohol, isopropyl, 98%	.80	.90
Diphenyl oxide	.70	.85
Phenylacitaldehyde	4.85	5.00
Potassium citrate	.37	.38
Sodium citrate:		
U.S.P. VIII	.23	.24
U.S.P. X	.29¼	.30½

DEPT. OF LABOR STATISTICS

	Feb.'36	Jan.'36	Feb.'35
Employment, Druggist's preparations *a*	97.7	97.6	102.4
Payrolls, Druggist's preparations *a*	94.2	95.3	97.9

a 1923-1925=100.0.

Producers of 98% isopropyl alcohol announced a 10c reduction in the middle of the month, but no change was made in the quotations on the 91% material.

Market for several aromatic chemicals is said to be none too steady. Items which are reported as being competitive include benzyl acetate and benzyl benzoate. Terpineol was slightly firmer at the reduced levels recently put in force, but diphenyl oxide was lowered 15c. A better than average demand was reported for benzaldehyde and linalyl acetate.

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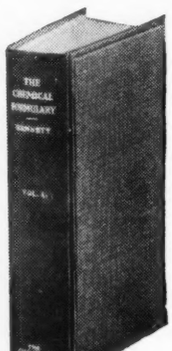

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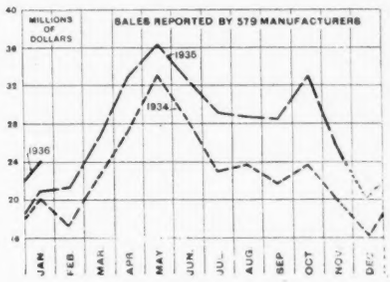
The situation in glycerine is an interesting one. Despite the fact that supplies of crude are specially scarce and quotations are largely nominal, producers have failed in the last few months to announce higher prices. One reason assigned for this is that they do not wish to encourage the introduction of substitutes.*

Paint Operations Expand Seasonally

Manufacturers Look for Best 2nd Quarter Sales Since '29— Shellac Market "Cracks" Wide-Open — Construction Totals Show Up Favorably—

The greatly delayed seasonal upswing in the paint industry finally got under way last month and week to week increases in production schedules were noted in most plants. Several producing establishments were temporarily affected by the flood



Trend in paint sales points upward.

conditions, but, generally, the industry is definitely convinced that the usual spring increase in sales will be greatly augmented by heavy requirements from the flood areas. Suppliers of raw paint materials are shedding their pessimistic feeling as the volume of shipments mounts. There is now talk that paint sales will come fairly close to the '29 level.

Price changes were few last month. White lead corroders are repeating 1st quarter prices for the 2nd 3-months period. Stearate manufacturers are also offering contracts at unchanged levels, but the market was upset somewhat when an unexpected decline in stearic acid was placed in effect a day or 2 after stearate renewal figures were posted. Ester gum quotations are unchanged.

The industry is interested particularly in chrome yellow prices for the 2nd quarter. In some quarters the opinion was expressed that there might be some effort made to bring quotations up from the very low level prevailing since late last year. On the whole, however, the trade looks for the renewal of most color prices at unchanged figures. Casein is again pointing upwards. There is a strong likelihood that firmer prices will prevail at least until the domestic production again comes into the market in large quantities.

Important Price Changes

ADVANCED

	Mar. 31	Feb. 29
Casein, 20-30	$0.15	$0.14½
80-100	.15½	.15
Dipentine	.41	.38

DECLINED

None.

DEPT. OF LABOR STATISTICS

	Feb.'36	Jan.'36	Feb.'35
Employment *a*	107.2	107.1	102.2
Payrolls *a*	93.5	91.8	83.7

	Feb. '36	Feb. '35
Pigments, Paints and Varnish, exports	$1,414,000	$1,137,000

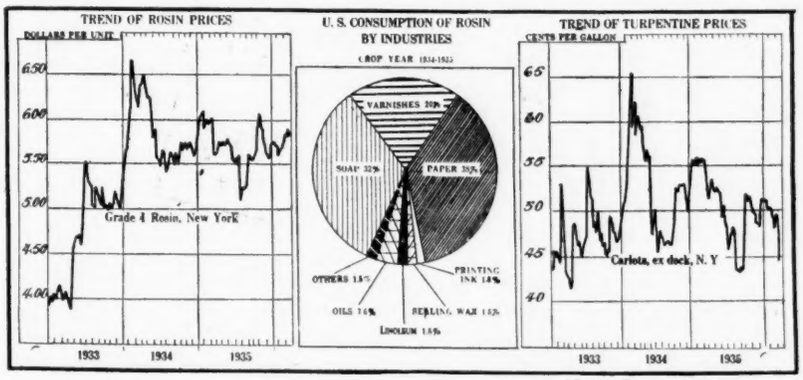
a 1923-1925=100.0.

Shellac "Off" 5c

The shellac markets broke badly last month, the decline in bonedry amounting to 5c. A highly competitive situation has been developing for some weeks and finally came to a head during the middle of the month. All quotations are largely nominal at the moment.

London Stocks Heavy

The London shellac situation remains unsettled, with large stocks still in the hands of the banks as a result of the failure of the shellac "corner" last spring. Movement of the new Indian spring crop in the next few weeks also will exert pressure on prices. However, increased demand here is held likely to offset these factors.



—N. Y. Journal of Commerce

C. C. C. holdings threaten stability of naval stores markets.

Consumer paint sales still were not at the level hoped for by manufacturers. Sales in the far-west and on the Coast were increasing more rapidly than in the East, where the severe weather has delayed operations. But this condition is considered but temporary.

January paint, varnish, lacquer and filler sales reported by 579 establishments to the Bureau of the Census totalled $24,141,272, which compares favorably with the January, '35, figure of $20,835,518 and the January, '34, figure of $20,141,156.

Computations made by the N. P. V. & L. A., on the basis of the current report of paint, varnish and lacquer sales by the Bureau of the Census, indicate that January, '36, sales were 15.9% above January, '35, 51.9% above January, '32 and 21.7% under January, '29.

Lead in Oil Up ½c

Price of white lead in oil was advanced ½c on the whole list early in April making it 11½c per lb. for 100-lb. kegs. Red lead in oil also shows a ½c increase, making 100-lb. kegs at 12c per lb.

Building Figures Expand

Construction continues to record large gains over the comparative levels of '35. For February a contract total of $142,050,200, covering all branches of construction, was reported by F. W. Dodge Corp. for the 37 states east of the Rocky Mountains. This was practically 90% larger than the total of only $75,047,100 reported for February, '35. Partly because of the unusually low temperatures and heavy snows the February contract volume was about 30% lower than the total of $204,792,800 registered for January of this year.

Total construction for the 1st 2 months of '36 amounted to $346,843,000 as against only $174,821,000 for the corresponding 2 months of '35, a gain over last year of 98%. For residential building alone the contract volume for the 1st 2 months of '36 totaled $68,615,000 for a gain of 76% over the total of $39,027,000 for the corresponding 2 months of '35.

President H. S. Wherrett, Pittsburgh Plate Glass, sounds a note of optimism on the glass and paint outlook in his annual stockholders' message. He sees little improvement in commercial building construction but expansion in modernization and residential building. He anticipates rapid expansion in safety glass production. Glassman Wherrett is perhaps better known in chemical circles as Vice-President Wherrett of Southern Alkali. He is a career man in the glass field, starting as a cub salesman with the Diamond Plate Glass Co., Kokomo, Ind., transferring to Pittsburgh Plate Glass' sales department in Pittsburgh, becoming successively assistant sales manager, manager of plate glass sales, chairman of the commercial department, a director and vice-president and finally president.

* On Apr. 6th producers finally placed a ½c advance in effect.

Many of the processes employed in the refining of coal tar products have been developed by the Koppers companies. A competent technical staff is constantly at work to introduce further process refinements and to insure the high quality of all Koppers products. The Koppers laboratories are abreast of all new developments in the field of coal tar products. Their services are at your command.

- **BENZOL** (All grades)
- **TOLUOL** (Industrial and Nitration)
- **XYLOL** (10° and Industrial)
- **SOLVENT NAPHTHA**
- **PHENOL** (82% and 90% Purity)
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- **CRESYLIC ACID** (98% Pale, low-boiling)
- **NAPHTHALENE**

(For construction and maintenance, Koppers also produces: Roofing, Waterproofing, Dampproofing, Creosote, Tar Base Paints and Coatings, and Tarmac for driveways, roads, pavements, etc.)

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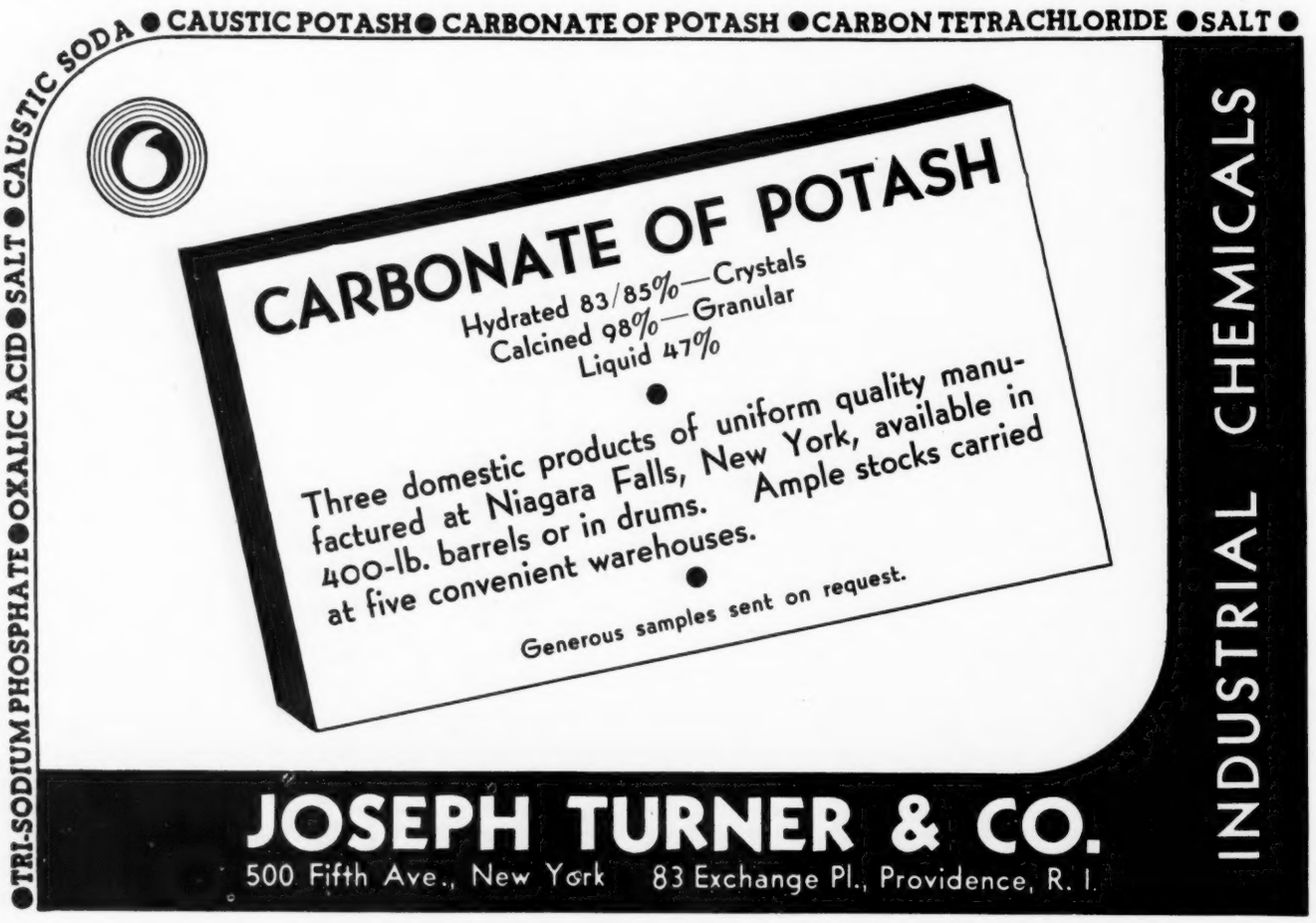
CAUSTIC SODA ● CAUSTIC POTASH ● CARBONATE OF POTASH ● CARBON TETRACHLORIDE ● SALT ●
TRI-SODIUM PHOSPHATE ● OXALIC ACID ● SALT ● CAUSTIC SODA
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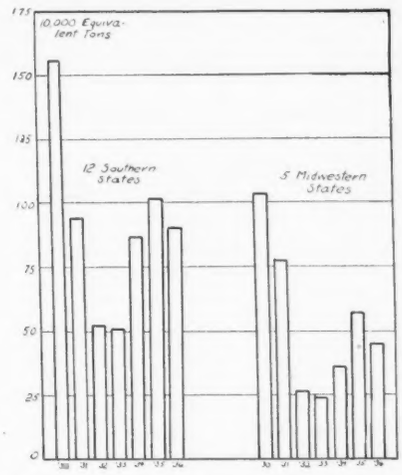
Fertilizer Mixers Start Active Season

Industry Deeply Concerned Over Price Structure — Cold Weather Has Affected Purchasing—Substantial Increase in Acreage Expected—Exports Reach Record Proportions—

The active fertilizer mixing season has at last gotten away to a late start. In some directions there is serious doubt that the season's volume will not be affected by the delay. Suppliers of the raw materials, however, are actually moving out considerable tonnages. The rather



Fertilizer tax tag sales, January-February period.

nominal prices that have prevailed for organic ammoniates for several months have been reduced considerably with the actual placing of good sized orders. A much stronger position in sulfate was reported when the seriousness of the floods in the Pittsburgh and other steel areas was appreciated. Shipments out of these sections will be in very small volume for several weeks, according to reliable reports. Spot buyers have been reported as paying as high as $26 a ton for sulfate. Many of the independent producers are said to be out of the market temporarily.

The price structure of mixed goods is said to have sagged rather badly in certain areas although the volume is said to be fairly satisfactory. The true test of the mixed goods markets will come within the next few weeks.

Reflecting the effect of extremely cold weather and uncertainties in connection with the agricultural adjustment program, fertilizer tax tag sales in February were somewhat under February, '35, but were well above the corresponding month of other recent years. According to reports by State control officials to The N. F. A., sales in the 17 reporting States totaled 572,514 tons, compared with 748,069 in February, '35; 533,146 tons in February, '34; and 312,142 tons in February, '33. February sales in the 12 Southern States amounted to 546,724 tons, representing a decline of 22% from the preceding year but gains of 9% and 85% over '34 and '33 respectively. Mississippi was the only one of the 12 States to report larger sales

Important Price Changes

ADVANCED

	Mar. 31	Feb. 29
Bone raw, 4½ and 50	$28.00	$27.00

DECLINED

Blood, dried, N. Y.	$ 3.00	$ 3.20
Blood, imp.	2.70	3.00
Bone meal, 3 and 50, imp.	23.00	23.25
Nitrogenous mat., imp....	2.20	2.25
Nitrogenous mat., East....	1.90	2.25
Tankage, grd., N. Y.	3.00	3.10
Tankage, ungrd., N. Y. ..	2.70	2.75
Tankage, South American	2.85	3.10
Fish meal, Jap. sardine ..	35.50	36.00

DEPT. OF LABOR STATISTICS

	Feb. '36	Feb. '35
Fertilizers & Materials:		
Exports	$1,639,000	$ 816,000
Imports	4,373,000	2,950,000

this year than last. Declines were particularly marked in the Carolinas. For the January-February period the decline from last year amounted to 13%, with Florida, Mississippi, and Louisiana showing increases. Total sales in the 5 Midwestern States, which experienced such severe weather during the month, were well under last year. The only state to show an increase was Kansas, but sales there were negligible. Sales in the 1st 2 months of the current year were 23% under the corresponding period of '35, but 25% larger than in '34.

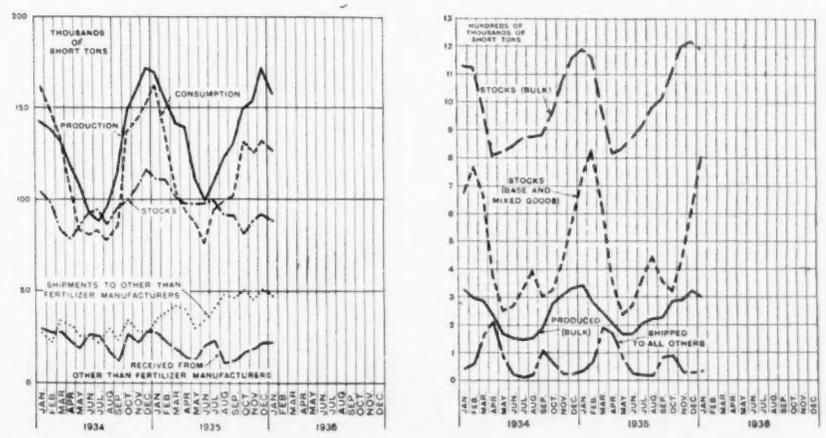
A substantial increase in the acreage of crops is to be expected this year, according to the Mar. 1 plans of 42,000 farmers as reported to the Dept. of Agriculture. These planting intentions indicate an increase of 6.5% in corn acreage, 19.2% in spring wheat acreage, 13.9% in flaxseed acreage, 11.7% in rice acreage, and 9.8% in tobacco acreage. A decrease in potato acreage of 3.4% is indicated, and in sweet potato acreage 4.1%. Department is prohibited by law from making any forecast as to cotton acreage, but private estimates indicate that the increase may be as much as 15%.

Fertilizer no longer constitutes such an important factor in cotton yields as it did in the past, however, a N. Y. Cotton Exchange Service report states. During the 5-year period, '26-'30, average amount of fertilizer applied per acre of the total cotton area was 99 lbs.; average cotton yield, per acre, 167.8 lbs. During the '31-'35 period, only 66 lbs. of fertilizer constituted average use; average yield of cotton was 190.4 lbs.

Fertilizer tag sales so far are equally uncertain as barometers. While the total sales in 9 cotton growing states during the Dec. 1-Feb. 28 period were only 789,000 tons, against 889,000 in the like period last year, a pick-up is looked for between now and May, the period of heaviest fertilizer sales. It is expected that the total December-May sales will top a year ago, naturally since acreage will be larger. Some quarters feel fertilizer sales may rise 12% to 15%. Slowness of early sales can be laid to uncertainties over the federal farm program and partly to poor weather. Ample rains are needed in Texas and Oklahoma to germinate the seed, particularly before late April.

January exports of fertilizer and fertilizer materials were the largest reported for that month in many years. They totaled 164,458 tons ($2,033,693), representing increases of 139% in tonnage and 206% in value over January, '35. Large increases occurred in exports of nitrogenous materials, phosphate rock and potash fertilizers. Rise in shipments of "sulfate" and "Other nitrogenous chemicals" (chiefly domestic synthetic sodium nitrate) was due principally to exports to Japan. Exports of all materials to Japan during the month accounted for 51% of the total value of January exports.

January imports, totaling 149,473 tons ($3,027,581), were 4% under January, '35 in tonnage and 0.3% less in value. With the exception of '35, however, January imports were the largest for the month since '30. Imports of nitrogenous materials were well above last year, but this



Trend in production, stocks and shipments of sulfuric by fertilizer manufacturers graphically shown in chart at the left. On the right, similar data for superphosphate.

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ATLANTA, GEORGIA—LOCKLAND, OHIO : IN FLORIDA, U. S. PHOSPHORIC CORP., TAMPA

increase in tonnage was more than offset by the decrease in imports of potash materials and particularly in low grade salts.

Employment and pay rolls in fertilizer plants usually increase substantially from January to February, reflecting the seasonal increase in production in anticipation of the Spring sales peak. This year, however, employment showed only a slight rise and pay rolls decreased, reaching the lowest levels for the month since '33, according to the indexes of the U. S. Bureau of Labor Statistics. Indexes for January and February are based on reports from 304 establishments.

Acetone Reduced

Makers Again Lower Quotations 1c — Dibutyl Phthalate Now at 17c — Alcohol Prices Extended — Better Call for Petroleum Solvents—

The competitive position in acetone became further aggravated last month with the result that producers placed in effect a further 1c reduction, the 2nd in 2 months. Dibutyl phthalate is now being quoted at 17c for tanks and 18c for carloads.

Important Price Changes

ADVANCED

	Mar. 31	Feb. 29
None.		

DECLINED

Acetone	$0.08½	$0.09½
Alcohol, C. D. 5	.40	.44

DEPT. OF LABOR STATISTICS

	Feb.'36	Jan.'36	Feb.'35
Petroleum Refining:			
Employment *a*	108.7	*z*108.7	107.3
Payrolls *a*	98.5	*z* 99.5	95.3
	Feb. '36		Feb. '35
Petroleum & Products:			
Exports	$16,879,000		$13,666,000
Imports	2,767,000		2,092,000

a 1923-1925=100.0; *z* Revised.

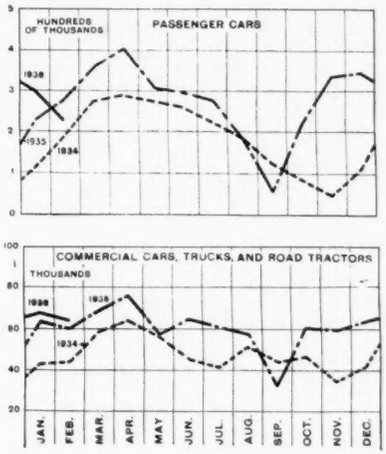
An increasing demand was reported for petroleum solvents from the lacquer, paint and rubber fields, particularly the latter, following the termination of the strike at the largest rubber plant in the Akron area. No changes of importance were reported at the East Coast or West Coast refineries or in Group III. Tankwagon quotations in the principal cities were also unaltered in the last 30 days.

Completely denatured alcohol prices were extended for the 2nd quarter. The price structure has slumped badly in the past 60 days (now at 40c) and competition is rife. Just what effect this will have on the present marketing scheme is still shrouded in mystery.

Another outstanding development is an announcement by alcohol distillers of a 2c reduction in proprietary solvent. New schedule, exclusive of the Pacific Coast, follows: Tank cars, 27c; carlots, drums, 32c; 20 drums, 34c, and smaller lots, 36c a gal. All quotations are f.o.b. the distilling point.

Outlook in Auto Production

Present expectations are that automobile production in American plants for



Trend in automobile production—March will show a sharp increase.

the 1st quarter will approximately equal the '35 level of 1,109,000 cars and trucks for the like period.

Domestic rubber consumption in March promised to fall below that of the corresponding 1935 period for the 2nd consecutive month. However, consumption for the year as a whole is expected in the trade to show a substantial gain over 1935.

Rubber factories probably used only about 40,000 tons of crude rubber, since the reopening of the Goodyear plant in Akron came too late to affect March consumption appreciably.

Disappointing consumption during February and March is ascribed partly to the changed date of introduction of the new automobile models. Larger sales of tires for new cars in the final quarter of the year should easily make up for the 1st quarter showing, however.

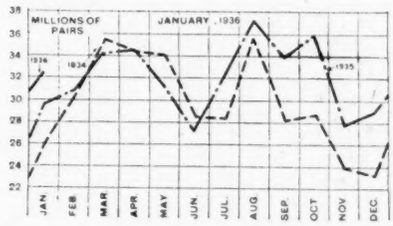
New Cracking Unit

A combination cracking unit, one of the largest yet to be constructed in the U. S., has entered commercial operation at the Beaumont, Texas, refinery of Magnolia Petroleum. Unit will be operated under license from Gasoline Products Co.

Gradual Improvement in Textiles and Tanning

Shoe Manufacturers Are Still Hesitant—Supplies of Divi-Divi Small—Several Textile Plants Affected by Floods—Bichromate Prices Are Firm—

Tanning and textile chemicals moved out in slightly better volume last month, yet both industries are still not operating at the capacities expected. This is particularly true in the leather field. Con-



Shoe production totals are higher than expected by trade.

siderable surprise was noted in some quarters at the size of the shoe production figures recently released, but tanners report that their operations and sales have failed to improve materially as yet. A decided upward trend was expected to follow the leather show at the Waldorf in N. Y. City, held late in March. Despite the "hand-to-mouth" purchasing policy pursued by most buyers, the price structure generally held firm last month and price changes were few. An $8 advance was made in divi-divi due to a scarcity of spot stocks, and several other tanstuff prices were revised slightly. There is little to report in the markets for tanners' oils. Newfoundland cod oil is scarce but prices have remained unchanged; 42c in

Important Price Changes

ADVANCED

	Mar. 31	Feb. 29
Divi Divi	$42.00	$34.00
Wattle bark, ship.	29.25	27.50

DECLINED

Mangrove bark	$26.50	$27.00
Myrobalans, J1	22.75	23.00

tank cars and 46c in drums, f.o.b. East. Fish oils are still quoted at 45c in tank cars and 50c in drums. No change is reported in neatsfoot oil. 20° cold test neatsfoot is quoted at 17c; extra neatsfoot, 10¾c; No. 1 neatsfoot, 10c; Sulfonated oil prices remain unchanged; 6½c for pure sulfonated cod; 6c with 25% mineral added and 5¾c with 50% mineral, basis f.o.b. East. Waterless Moellon is quoted at 7½c; Moellon containing 25% moisture, 6¾c; commercial sulfonated neatsfoot, 10¾c. Sulfonated castor oil, 11½c for 75% and 9c for 50%. There was a slightly better demand for tallow.

Bichromate prices are firm and producers reported a slight improvement in demand. Consumption of most textile chemical specialties was off slightly in several centers due to the flood conditions.

While demand for leather has been slow in recent weeks, tanners expect that orders will start to increase shortly, as shoe manufacturers have been using up their reserve stocks.

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Acetaldehyde
Crotonic Acid
Iron Acetates
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Aluminum Acetate
Aluminum Formate
Sucrose Octa Acetate
Other Acetate Salts

SPECIFICATIONS

Technical Grade

Methyl Acetate	82% to 85%
Acidity as Acetic	0.01% maximum
Specific Gravity	0.91 to 0.92 @ 15° C.
Boiling Range	52° to 58° C.
Water	Substantially dry
Color	Water-white
Chlorides	None
Iron	None

C. P. Grade

Methyl Acetate	97% minimum
Acidity as Acetic	0.005% maximum
Specific Gravity	0.937 to 0.943 @ 15° C.
Boiling Range	55° to 58° C.
Water	Substantially dry
Color	Water-white
Chlorides	None
Iron	None

NIACET Methyl Acetate is made from synthetic acetic acid and pure methanol, giving a Technical grade of such purity that 90% will distill within a 2° range.

NIACET C. P. Methyl Acetate can be furnished which will stand 20 volume dilution test.

Methyl Acetate readily dissolves cellulose esters and can be used as a **LOW BOILING** lacquer **SOLVENT.** It also finds application in the manufacture of **EXTRACTS** and **PERFUMES** and is used in **ORGANIC SYNTHESIS.**

Other uses are found for this ester in **RUBBER CEMENTS** and in formulating **MIXED SOLVENTS.**

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Stocks Advance to Highest Peak In 5 years

Chemical Group Participates in Forward Movement—Allied Gains 27 Points — Cyanamid Reports Best Year with the Exception of '30—Dow Plans Stock Increase—Allied's Stock Holdings Revealed—

Stock values last month reached their highest point since April, '31. The net gain was $466,229,613 for the complete list on the N. Y. Stock Exchange. On Apr. 1, '31, the previous high point, market value was $53,336,000,000, while the low point for the past decade was established July 1, '32, at $15,600,000,000. Stocks have advanced successively during the 1st 3 months of this year despite several weak spells.

Chemical stocks participated in the general market advance. On Apr. 1st, the total value of the group reached $5,697,259,569 and the average value $72.00. This compares with $5,363,814,662 and $72.28 respectively. The apparent contradiction in the average price is caused by the fact that additional shares were listed by some companies in the group and consideration of these figures must always be qualified by the statement that the total number of shares vary from time to time. The net gain in value for the chemical group since the 1st of the year reached $618,275,864 on Apr. 1.

Results of Expansion

American Cyanamid's plant expansion program, initiated in '29 and in process of digestion and co-ordination over the past 5 years, found reflection in increased earning power last year. Net profits of $4,062,159 in '35 were the largest ever shown by the company, with the exception of '30 when net was $4,618,099.

Over the last 3 years about $2,000,000 a year has been spent on new plants and equipment designed to increase operating efficiency. Gross property account was increased to $56,864,000 in '35, from $52,229,000 in '33. Much of this went into a new building for the Calco subsidiary to concentrate a number of operations at one plant.

Last year, Cyanamid reduced overhead and improved its financial position by the sale of $6,400,000 of 4% debentures. Proceeds of the latter, together with $2,600,000 serial bank loans, cleared up the old 5% and 6% funded debt and strengthened working capital. Average cost of the new funds, including discounts, was 4¼%.

Report of Cyanamid and subsidiaries for year ended Dec. 31, '35, certified by independent auditors, shows consolidated net profit of $4,062,160 after depreciation, depletion, interest, federal taxes, minority interest and other charges, equivalent to $1.61 a share (par $10) on combined 2,520,368 shares of Class A and Class B common stock outstanding at end of the period, including shares reserved for stocks not yet presented for exchange, but excluding 157,674 shares of Class B stock held by subsidiaries. This compares with consolidated net profit in '34, of $2,495,644, equal to 99c a share on combined 2,520,370 Class A and B common.

Dow Corporate Stock Structure

Dow Chemical directors have called a special stockholders' meeting for Apr. 21 to approve an increase in authorized shares of no-par value common from 1,000,000 to 2,000,000 shares and to authorize 60,000 shares of 5% cumulative preferred stock.

Holders of 30,000 shares of 7% cumulative preferred stock now outstanding will be offered the right to exchange their stock share for share for new 5% preferred. Company proposes to redeem on Aug. 15 any 7% preferred stock not exchanged. Common stockholders will be offered new preferred in a proportion to their holdings yet undetermined at $105 a share. There will be no present offering of any no-par value common. Proceeds from the preferred stock sale will be used for plant betterments, extensions and the increase of working capital.

Allied Issues '35 Report

Allied's pamphlet report for '35 shows net income of $21,701,275 after all deductions, equal after preferred dividends to

Price Trend of Chemical Company Stocks

	Feb. 29	Mar. 6	Mar. 13	Mar. 20	Mar. 27	Mar. 31	Net gain or loss last month	Price on Mar. 30, 1935	1936 High	1936 Low
Air Reduction	183†	183	181	186	187½	185⅞	+ 2⅞	110½	194	168½
Allied Chemical	172½	193½	178	193¾	199	199½	+27	131¾	200*	157
Columbian Carbon	102	103	98	115¾	111	112½	+10½	73½	114½*	94
Com. Solvents	23⅜	22¾	20¾	21½	20⅞	20⅞	— 2½	19¼	24⅝	20¼
du Pont	143⅞	148¼	141⅝	148	145¾	144¼	+ ⅜	89½	151½*	138
Hercules Powder	101†	103½	102¾‡	102	98	102	+ 1	71	105½	84
Mathieson	34¼	34¾	32¾	33¼	32¼	32⅛	— 2⅛	26	36½	30
Monsanto	97†	102	98½	99	100½	101§	+ 4	59	103*	89¼
Std. of N. J.	59⅞	61¾	64⅝	69⅜	64⅞	64⅞	+ 5	37	70*	51⅛
Texas Gulf S.	37½	37⅜	35⅜	35⅜	34	34¼	— 3¼	30	38¾	33
Union Carbide	82¾	85¾	81⅛	84	82	81½	— 1¼	46⅛	87	71⅝
U. S. I.	42⅛	46	50½	50¾	47½	48⅛	+ 6	38¼	51*	39

* New highs in March; † Feb. 28; ‡ Mar. 14; § March. 30.

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbott Lab., extra	10c	Mar. 18	Apr. 1
Abbott Lab.	75c	Mar. 18	Apr. 1
Air Reduction	75c	Mar. 31	Apr. 15
Aluminum of Am., pf.	37½c	Mar. 14	Apr. 1
Aluminum of Am., pf.	50c	Mar. 14	Apr. 1
Am. Cyanamid, Cl. A	15c	Mar. 14	Apr. 1
Am. Cyanamid, Cl. B	15c	Mar. 14	Apr. 1
Am. Maize Prod.	25c	Mar. 24	Mar. 31
Am. Maize Prod., pf.	$1.75	Mar. 24	Mar. 31
Am. Smelt. & Rfg.	40c	May 1	May 29
Am. Smelt. & Rfg., 1st pf.	$1.75	Apr. 10	Apr. 30
Am. Smelt. & Rfg., 2nd pf.	$1.50	Apr. 10	Apr. 30
Bon Ami, Cl. A	$1.00	Apr. 15	Apr. 30
Bon Ami, Cl. B	50c	Mar. 10	Apr. 1
Canad. Celanese	40c	Mar. 17	Mar. 31
Canad. Celanese, 7% pt. pf.	$1.75	Mar. 17	Mar. 31
Canad. Celanese, 7% pt. pfd.	95c	Mar. 17	Mar. 31
Celanese Corp. of Am.	50c	Apr. 1	Apr. 15
Celanese Corp. of Am., 7% pr. pf.	$1.75	June 16	July 1
Celanese Corp. of Am., 7% 1st pt. pf.	$3.50	June 16	June 30
Celanese Corp. of Am., 7% cu. pr. pf.	$1.75	Mar. 17	Apr. 1
Celanese Corp., 7% 1st pt. pf. Pt.	68c	Mar. 17	Apr. 1
Chickasha Cotton Oil	50c	Mar. 9	Apr. 1
Climax Molybdenum	20c	Mar. 14	Mar. 31
Clorox Chem.	50c	Mar. 20	Apr. 1
Clorox Chem., extra	12½c	Mar. 20	Apr. 1
Colgate-Palmolive-Peet, pf.	$1.50	Mar. 5	Apr. 1
Devoe & Raynolds, A	50c	Mar. 20	Apr. 1
Devoe & Raynolds, B	50c	Mar. 20	Apr. 1
Devoe & Raynolds, 2nd pf.	$1.75	Mar. 20	Apr. 1
du Pont	$1.50	Apr. 10	Apr. 25
Eagle Picher Lead, pf.	$1.50	Mar. 20	Apr. 1
Eastman Kodak, extra	25c	Mar. 5	Apr. 1
Eastman Kodak	$1.25	Mar. 5	Apr. 1
Eastman Kodak, pf.	$1.50	Mar. 5	Apr. 1
Freeport Texas, pf.	$1.50	Apr. 15	May 1
Gen. Paint, Cl. A	50c	Mar. 16	Apr. 1
Gen. Print. Ink	50c	Mar. 18	Apr. 1
Gen. Print. Ink, pf.	$1.50	Mar. 18	Apr. 1
Glidden	50c	Mar. 18	Apr. 1
Glidden, pf.	$1.75	Mar. 18	Apr. 1
Hercules Powder, pf.	$1.75	May 4	May 15
Indus. Rayon	42c	Mar. 23	Apr. 1
Int'l Print. Ink	45c	Apr. 13	May 1
Int'l Print. Ink, pf.	$1.50	Apr. 13	May 1
Int'l Salt	37½c	Mar. 16	Apr. 1
Int'l Nickel	25c	Mar. 2	Mar. 31
Int'l Nickel, pf.	$1.75	Apr. 1	May 1
Koppers Gas & Coke, 6% pf.	$1.50	Mar. 12	Apr. 1
Liq. Carbonic	40c	Apr. 16	May 1
Mathieson Alkali	37½c	Mar. 4	Mar. 31
Mathieson Alkali, pf.	$1.75	Mar. 4	Mar. 31
Merck	10c	Mar. 23	Apr. 1
Merck, pf.	$1.50	Mar. 23	Apr. 1
Monroe Chem., pf.	87½c	Mar. 14	Apr. 1
Nat'l Lead	$1.25	Mar. 13	Mar. 31
Nat'l Lead, pf. B	$1.50	Apr. 17	May 1
N. J. Zinc	50c	Apr. 20	May 9
Penn Salt, extra	$1.00	Mar. 31	Apr. 15
Penn Salt	75c	Mar. 31	Apr. 15
Pitts. Plate Glass	$1.00	Mar. 10	Apr. 1
Pitts. Plate Glass	50c	Mar. 10	Apr. 1
P. & G., 8% pf.	$2.00	Mar. 25	Apr. 15
Sherwin-Williams, Ltd., pf.	$1.75	Mar. 15	Apr. 1
Spencer Kellogg	40c	Mar. 14	Mar. 31
Tubize-Chatillon, 7% pf.	$3.50	Apr. 10	May 1
Tubize-Chatillon, 7% pf.	$1.75	Mar. 10	Apr. 1
Union Carbide	50c	Mar. 6	Apr. 1
United Carbon	60c	Mar. 16	Apr. 1
United Dyewood, pf.	$1.75	Mar. 13	Apr. 1
U. S. I.	50c	Mar. 16	Apr. 1
Westvaco Chlorine, pf.	$1.75	Mar. 16	Apr. 1

$8.71 a share on the common, compared with $17,548,355, or $6.83 a share, in '34. All of the preferred stock has been redeemed since the end of the year, leaving 2,214,099 shares of common as the only capital stock outstanding. Neither borrowing nor financing was required to retire the preferred stock, at a cost of $41,760,000.

Report states that it has not been necessary to use any part of the $40,000,000 reserve set up in '31 for the protection of the company's investments and securities, but final disposition of the reserve has been deferred pending further developments.

Allied holdings of marketable securities were revealed last month as consisting of 224,000 shares of U. S. Steel common and 90,000 shares of capital stock of Air Reduction, on Dec. 31, '34. While the entire list of other investments of Allied were not made public because they did not come under the 15% rule of the SEC, reports made available filed under section 16 of the Exchange Act show that the company owns 54,500 shares of common stock of Sloss-Sheffield Steel & Iron as of Aug. 8, '35. On the same date Allied also owned 43,502 shares of the 6% participating preferred, 3,100 shares of the 7% preference and 3,416 shares of the common stock of Virginia-Carolina Chemical.

V.-C. issues went into new high ground around the middle of the month, following the publication of Allied's outside stockholdings, leading many to believe that the latter was acquiring control of the fertilizer company. According to reports, Allied has held a large block of V.-C. stock for 10 years, acquired when V.-C. went through reorganization and Allied as a large creditor accepted stock.

Carbide Reports $3.03 a Share

Net income of Carbide for '35 was $27,254,248, or $3.03 a share on the 9,000,743 shares of capital stock. This compares with $20,277,442, or $2.25 a share for '34. Report of the company, signed by Jesse J. Ricks, president, states that part of the gain came from general business improvement but that it was largely due to the introduction of new products and the development of new uses for existing products.

Company reported that $11,630,461 was spent for new properties, including new and enlarged plants at Whiting, Ind., Alloy, W. Va., and South Charleston, W. Va. In addition, there were built better facilities for production and transportation of gases and carbon products, and the West Virginia hydro-electric plant was moved toward completion.

Report reviews the refinancing that took place during the year resulting in the private sale of $16,750,000 of 15-year 3½s and the calling of preferred stock and debt, with 2 exceptions of subsidiaries. Refunding will save considerably in interest and dividends as some of the called issues bore high rates. Two issues still outstanding are those of the Aktienselskabet Saudefaldane, $3,303,500 of 5s due Oct. 1, and of the Electro Metallurgical, $1,165,000 of 6s due Feb. 1, '37.

Monsanto Sales Up 8%

Monsanto reports consolidated net earnings for '35 of $4,009,872, equal after deductions for subsidiary and minority interests of $3,843,390, or $3.85 a share on 999,123 shares. In '34 company earned $2,771,629, or $3.21 a share, on 864,000 shares. Net sales were $24,705,574, an increase of 8%. Company's report noted that sales rose in spite of some price reductions and the loss of some large-volume but low-profit business.

Report states that each unit of the company realized greater net earnings than in the preceding year and justified the heavy capital expenditures of recent years. Company spent $3,739,129 on plant, $1,283,274 on repairs and $687,978 on research in '35. Charges for plant were unusually large and non-recurring. There was a non-recurring profit of $138,308 from the sale of an investment. Company's '35 research and development expenditures were the largest in its history. Current budget calls for a still greater expenditure on this phase of the company's activities.

V.-C. to Retire 7% Stock

V.-C. Directors have approved redemption and retirement of all of the company's 7% cumulative prior preference stock. About 38,000 shares are held by the public. Stock will be redeemed on June 1, subject to the stockholders' approval, at $110 a share plus unpaid accumulated dividends of $23.50 a share. To consummate this redemption and to keep the company's working capital adequate, arrangements have been made with the Bank of the Manhattan Co. for a loan of one to 4 years, totaling $2,500,000, at rates of from 2 to 3½%. Saving in interest charges will be about $200,000 a year, and franchise taxes will be lowered as a result of the reduction in capital, according to A. L. Ivey, president.

Mr. Ivey stated a special meeting of stockholders would be held in Richmond late in April.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1935	Net income 1934	Common share earnings 1935	Common share earnings 1934	Surplus after dividends 1935	Surplus after dividends 1934
Air Reduction:							
Year, December 31	§$3.00	$5,292,866	$4,145,416	$6.29	$4.98	$699,662	$408,275
American Cyanamid:							
Year, December 31	*w*.15	4,062,160	2,495,644	*c*1.61	*c*.99	2,927,994	1,621,018
Carman & Co.:							
Year, December 31	*f*....	83,321	39,524	*b*.27	*a*1.16	.....	.....
Colgate-Palmolive-Peet:							
Year, December 31	*k*.75	4,141,721	3,744,107	1.36	1.16	1,198,003	1,267,283
Columbian Carbon:							
Year, December 31	§4.00	2,992,860	2,111,367	5.56	3.92	635,950	290,534
Corn Products Refining:							
Year, December 31	3.00	8,347,907	9,702,696	2.62	3.16	*d*960,509	407,946
Duval Texas Sulphur:							
Year, December 31	*f*....	78,223	*.....	.15	....	.....	.....
Eastman Kodak:							
Year, December 28	§5.00	15,913,251	14,503,247	6.90	6.28	.....	.....
Heyden Chemical:							
Year, December 31	§1.00	504,831	482,646	3.22	3.07	296,093	261,712
International Nickel of Canada:							
December 31 quarter	*k*.75	8,005,700	4,469,670	.51	.27	3,877,683	1,799,470
Year, December 31	*k*.75	26,086,527	18,487,479	1.65	1.13	13,219,002	9,264,496
Merck:							
Year, December 31	.40	931,565	983,272	1.77	1.91	.....	.....
Monsanto Chemical:							
Year, December 31	§1.00	3,939,751	2,771,629	*h*3.84	*h*3.20	.....	.....
Newport Industries:							
Year, December 31	*f*....	295,117	161,619	.57	.31	.....	.....
Pittsburgh Plate Glass:							
Year, December 31	*k*2.90	11,398,739	5,763,684	5.32	2.69	4,972,669	2,659,070
Texas Gulf Sulphur:							
Year, December 31	2.00	7,468,017	6,958,476	1.94	1.81	*d*211,983	1,228,476
United Chemicals:							
Year, December 31	*f*....	†49,596	†82,131	....	....	.....	.....
U. S. Industrial Alcohol:							
Year, December 31	2.00	843,742	1,580,067	2.15	4.03	.....	.....
Vanadium of America:							
Year, December 31	*f*....	†425,791	†861,017	....	....	.....	.....

* Not available; † Net loss; § Plus extras; *a* On Cl. A stock; *b* On Cl. B stock; *c* On combined Cl. A and Cl. B shares; *d* Deficit; *f* No common dividend; *h* On shares outstanding at close of respective periods; *k* Paid in year 1935; *w* Last dividend declared, period not announced by company.

Annual Reports for Last Year

Company:	Fixed chgs. times earn.	Pfd. div. times earned	Cash and mark. securities	Inventories	Ratio cur. assets to cur. liab.	Working capital
Allied Chemical & Dye:						
Year, Dec. 31, 1935	No fd. dbt.	8.97	¶$88,050,850	$21,735,370	10.4	$109,360,735
Year, Dec. 31, 1934	No fd. dbt.	7.25	¶78,098,892	20,639,325	10.3	100,259,903
Columbian Carbon:						
Year, Dec. 31, 1935	No fd. dbt.	No pfd.	3,339,047	1,906,799	6.2	5,769,226
Year, Dec. 31, 1934	No fd. dbt.	No pfd.	3,265,367	2,235,843	8.1	5,890,810
International Printing Ink:						
Year, Dec. 31, 1935	No fd. dbt.	3.32	†1,958,415	3,592,421	6.1	6,537,976
Year, Dec. 31, 1934	No fd. dbt.	2.75	†2,589,382	3,309,636	10.9	6,812,708

¶ Securities carried at cost; † Cash only.

OTHER EASTMAN CHEMICALS

•

Hydroquinone

Silver Nitrate

Gallic Acid

Cellulose Acetate

Nitrocellulose Products

Research Organic Chemicals

•

PYROGALLIC ACID, *C. P.*

UNIFORM — PURE — FRESHLY MADE

THESE three properties offer the purchaser of Eastman Pyrogallic Acid, C. P., a quality suitable for the most exacting work. Continuous production, meeting the stringent requirements of a photographic developer, assures prompt shipment from fresh stocks.

Further information and quotations will be furnished on request. Eastman Kodak Company, Chemical Sales Division, Rochester, N. Y.

EASTMAN TESTED CHEMICALS

Cellulose Acetate
Sodium Acetate
Cresylic Acid
Acetic Anhydride
Casein
Dibutyl Phthalate
Dimethyl Phthalate
Diethyl Phthalate
Triphenyl Phosphate
Triacetin

Associated Company
CHAS. TENNANT & CO. (CANADA) LTD.
372 Bay Street, Toronto 2, Canada

AMERICAN-BRITISH
CHEMICAL SUPPLIES, Inc.
180 MADISON AVE., NEW YORK

Chemical Stocks and Bonds

1936 Last	1936 March High	1936 March Low	1935 High	1935 Low	1934 High	1934 Low	Sales	Stocks	Par $	Shares Listed	An. Rate*	Earnings $-per share-$ 1935	Earnings $-per share-$ 1934
							Number of shares Mar. 1936	1936					
NEW YORK STOCK EXCHANGE													
186½	194	168½	173	104⅜	113	91¾	10,100	29,000	Air Reduction	No	841,288	$5.50	6.29	4.98
200	205	157	173	125	160¾	115⅛	122,300	154,700	Allied Chem. & Dye	No	2,214,099	6.00	8.71	6.83
56	63¼	52	57¾	41½	48	25¼	12,800	41,200	Amer. Agric. Chem.	100	315,701	2.00	.....	*p*6.37
28⅝	32⅝	27	35¾	22½	62½	20¾	52,700	128,500	Amer. Com. Alcohol	20	260,716	None	.....	3.57
40	50	39¾	52	36	39⅛	26¼	4,100	30,700	Archer-Dan-Midland	No	541,546	1.50	....	*p*4.21
64	73	48	48½	32¾	55½	35¼	3,100	19,600	Atlas Powder Co.	No	234,235	2.25	2.81	2.49
123¾	125½	112	115	106¾	106¾	83	540	2,990	6% cum. pfd.	100	88,781	6.00	16.93	13.54
28	32¼	26¼	35⅜	19½	44⅞	17⅛	98,700	403,000	Celanese Corp. Amer.	No	987,800	None	1.99	1.25
17⅞	20½	17¼	21	15⅝	18⅛	9⅜	56,600	168,400	Colgate-Palm.-Peet	No	1,985,812	.75	.....	1.16
103	106½	102½	107¼	101	102½	68½	1,200	3,800	6% pfd.	100	254,500	6.00	.....	15.14
112½	118¼	94	101¼	67	77¼	58	20,700	47,300	Columbian Carbon	No	538,154	4.00	5.56	3.93
21¼	24⅝	20¼	23⅞	16½	36¾	15¾	231,700	989,500	Commer. Solvents	No	2,635,371	.60	1.02	.89
71½	78½	68½	78⅜	60	84½	55½	52,700	175,100	Corn Products	25	2,530,000	3.00	2.62	3.16
166	166	162	165	148¾	150½	135	700	2,200	7% cum. pfd.	100	243,739	7.00	33.97	39.65
55	57½	42	50⅜	35½	55¼	29	7,300	27,500	Devoe & Rayn. A	No	95,000	2.00	.....	2.36
146½	151⅜	138	146½	86⅝	103⅞	80	45,400	118,700	DuPont de Nemours	20	10,871,997	3.60	5.04	3.63
133	133	129	132	126⅞	128½	115	1,600	6,600	6% cum. deb.	100	1,092,699	6.00	56.94	42.73
168¼	168¼	156½	172¼	110½	116½	79	14,300	33,700	Eastman Kodak	No	2,250,921	5.75	6.90	6.28
164	166	158	164	141	147	120	290	650	6% cum. pfd.	100	61,657	6.00	.....	235.22
31	35⅜	28½	30⅝	17¼	50⅜	21½	30,500	153,800	Freeport Texas	10	784,664	1.00	1.78	1.76
130¼	132	125	125	112½	160⅛	113½	250	760	6% conv. pfd.	100	25,000	6.00	121.30	120.08
49¼	55¼	45¼	49½	23⅜	28⅜	15⅝	26,100	106,600	Glidden Co.	No	603,304	2.00	.....	*x* 2.91
108½	114½	107	111	104⅞	107½	83	700	2,620	Glidden, 7% pfd.	100	63,044	7.00	.....	*x*40.70
125⅜	133	120	119½	85	96⅞	74	800	8,400	Hazel Atlas	25	434,409	5.00	7.58	5.21
102	105½	84	90	71	81⅝	59	2,200	26,500	Hercules Powder	No	582,679	3.50	4.23	3.94
133¼	133¼	128	131	122	125¾	111	200	1,570	7% cum. pfd.	100	105,765	7.00	36.30	28.79
29½	31⅞	28½	36⅜	23½	32	19⅜	43,200	115,200	Industrial Rayon	No	600,000	1.68	1.00	2.23
5⅜	5⅞	3¾	5	2⅝	6⅛	2	65,100	216,200	Intern. Agricul.	No	436,049	None	.....	*p*—.99
37¼	41	33	42¾	26	37¼	15	16,900	37,900	7% cum. pr. pfd.	100	100,000	None	.....	*p*2.69
48⅞	54¼	44⅛	47¼	22¼	29¼	21	204,900	792,800	Intern. Nickel	No	14,584,025	1.00	.....	1.14
25⅝	29¼	25⅜	36¼	25	32	21	2,200	11,200	Intern. Salt	No	240,000	1.50	1.32	2.02
32½	36¾	32¼	36¼	31	33⅛	15¾	5,500	13,600	Kellogg (Spencer)	No	500,000	1.60	.....	*v*2.22
58⅞	63⅛	47¼	49¼	21½	43⅞	22½	118,700	273,600	Libbey Owens Ford	No	2,559,042	2.00	3.26	1.25
40	41½	36½	37¼	24½	35⅜	16⅛	12,400	60,100	Liquid Carbonic	No	342,406	1.60	.....	*v*2.58
32⅜	36½	30	33⅞	23¾	40¾	23½	32,500	129,800	Mathieson Alkali	No	650,436	1.50	1.44	1.20
100½	103	89¼	94¾	55	61⅝	39	9,600	36,200	Monsanto Chem.	10	864,000	1.25	3.84	3.03
300	305	204	206	145	170	135	2,300	9,525	National Lead	100	309,831	5.00	10.78	8.38
160	162½	150	162½	150	146½	122	200	400	7% cum. "A" pfd.	100	243,676	7.00	25.40	20.12
139⅛	143	137¾	140½	121⅝	121½	100½	560	1,730	6% cum. "B" pfd.	100	103,277	6.00	49.05	35.36
12	13¾	9⅞	10⅞	4⅜	13	5½	165,200	363,300	Newport Industries	1	519,347	None	.57	.31
154¾	163½	128	129	80	94	60	12,500	55,200	Owens-Illinois Glass	25	1,200,000	5.00	6.52	5.41
46⅝	49	44⅝	53¾	42⅜	44⅜	33⅛	26,300	83,800	Procter & Gamble	No	6,410,000	1.70	.....	*p* 2.23
119½	122½	118¾	121	115	117	102½	360	1,310	5% pfd. (ser. 2-1-29)	100	171,569	5.00	.....	*p*88.13
9	10¼	7½	8¾	4	6¾	3⅛	99,400	252,500	Tenn. Corp.	5	857,896	None	.....	.27
34½	38¾	33	36¾	28¾	43¼	30	45,100	210,400	Texas Gulf Sulphur	No	2,540,000	2.00	1.94	1.81
82	87	71⅜	75¾	44	50⅞	35⅞	65,600	273,200	Union Carbide & Carbon	No	9,000,743	2.00	3.06	2.28
73½	79	68	78	46	50⅜	35	13,600	47,700	United Carbon	No	370,127	2.40	4.71	3.55
50	53⅜	39	50⅝	35⅛	64¾	32	166,100	222,400	U. S. Indus. Alco.	No	391,033	2.00	2.16	4.04
22⅝	27¼	20¼	21¾	11¼	31¾	14	31,300	221,500	Vanadium Corp.-Amer.	No	366,637	None	.....	—2.29
7¼	8⅜	4⅛	4⅝	2½	5⅜	1⅞	47,900	251,300	Virginia-Caro. Chem.	No	486,000	None	.....	*p*—.79
43¼	48¾	32	35¾	17½	26	10	50,100	170,500	6% cum. part. pfd.	100	213,392	None	.....	*p*4.20
133	133	105	120½	85	84	59¾	3,600	6,700	7% cum. prior pfd.	100	60,000	8.00	.....	*p*23.50
24	28½	23	25½	16¾	27¼	14⅞	7,600	48,500	Westvaco Chlorine	No	284,962	.40	1.63	1.55
NEW YORK CURB EXCHANGE														
36½	40¾	29¼	30	15	22½	14⅝	70,100	219,500	Amer. Cyanamid "B"	No	2,404,194	.60	.....	.99
3	3¾	3⅛	4	2	4⅛	2⅜	1,300	7,400	British Celanese Am. R.	10	2,806,000	None	.....	.....
113½	116¼	107½	115	90	105¼	81	1,150	3,350	Celanese, 7% cum. 1st pfd.	100	144,379	7.00	.....	16.37
113⅜	116	107¼	111¼	97½	102	83	225	2,300	7% cum. prior pfd.	100	213,668	7.00	.....	28.13
12	16½	12⅜	15	7	19	7	450	2,650	Celluloid Corp.	15	194,952	None	.....	—1.67
13	15	13¼	14½	11⅜	14⅜	10½	.....	2,100	Courtaulds' Ltd.	1 £	24,000,000	7½%	.....	7.57%
117½	124¾	95⅛	105½	80½	91	67½	6,200	23,200	Dow Chemical	No	945,000	2.00	.....	3.32
8⅝	10¾	7	12½	6¼	10¾	4	12,700	28,200	Duval Texas Sulphur	No	500,000	None	.....	*z* .25
49¼	55	48	58	37	40¾	19	1,400	3,500	Heyden Chem. Corp.	10	147,600	1.50	3.22	3.07
129¾	129¾	98¼	97¼	46¾	57½	39	9,100	28,240	Pittsburgh Plate Glass	25	2,141,305	3.00	5.32	2.69
143	145½	118½	128⅞	84	90½	47¼	14,050	33,850	Sherwin Williams	25	635,583	4.00	.....	*y*6.19
113	113½	110¾	113½	106	109¾	100	350	2,960	5% pfd. cum.	100	155,521	5.00	.....	*y*33.17
PHILADELPHIA STOCK EXCHANGE														
128	130	114¼	116¾	76½	75	50¼	275	870	Pennsylvania Salt	50	150,000	4.00	.....	*p*6.82

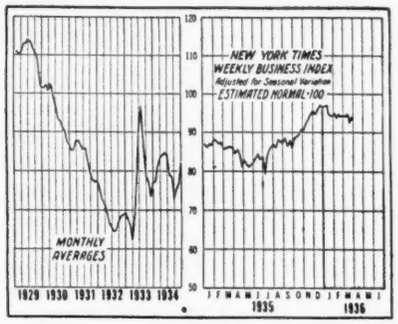
1936 Last	1936 March High	1936 March Low	1935 High	1935 Low	1934 High	1934 Low	Sales	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE							Mar. 1936	1936				
114¾	117½	112½	116	104½	106¾	83⅞	316,000	1,429,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N. 29,929,000
26¼	30⅛	24	29¾	7⅜	17¾	5	246,000	1,532,000	Anglo Chilean s. f. deb. 7's	1945	7	M. N. 12,700,000
99	101¾	92½	94½	77⅜	88	61½	158,000	451,000	By-Products Coke Corp. 1st 5½'s "A"	1945	5½	M. N. 4,932,000
102	102¾	99	100¼	91⅛	92	62	113,000	283,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M. N. 5,994,100
25¾	27¼	21	21½	7	19½	5⅛	488,000	4,923,000	Lautaro Nitrate conv. b's	1954	6	J. J. 31,357,000
84¾	84¾	66½	94	65	98½	89⅞	66,000	151,000	Montecatini Min & Agric. deb. 7's with war.	1937	7	J. J. 7,075,045
29⅛	35	29⅛	38	32⅛	74½	34½	11,000	19,000	Ruhr Chem. 6's	1948	6	A. O. 3,156,000
104	105	103¾	104	91½	90	65½	36,000	135,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S. 3,007,900
91⅜	95¾	87	94¼	66	89½	62	110,000	395,000	Vanadium Corp. conv. 5's	1941	5	A. O. 4,261,000

† Year ended 5-31-35; *p* Year ended 9-30-35; *v* Year ended 8-1-35; *y* Year ended 8-31-35; *z* Year ended 8-31-35; * Including extras; *x* Year ended 10-31-35.

Industrial Trends

Flood Conditions Adversely Affect Seasonal Upturn in Business, But Volume Holds at Surprisingly High Levels—Steel Activity at 6-Year Peak—Commodity Markets Lose Ground—

Serious flood conditions in many of the principal industrial areas affected the business trend last month. Thus, the usual seasonal Spring upturn, which


NEW YORK TIMES
WEEKLY BUSINESS INDEX
Adjusted for Seasonal Variation
ESTIMATED NORMAL-100
MONTHLY AVERAGES
1929 1930 1931 1932 1933 1934
J F M A M J J A S O N D J F M A M J
1935
1936

Downward trend in business activity was checked in the last week in March.

should have reached a peak in March, did not attain the proportions that were confidently expected at the turn of the year. Just how much of this delayed business can still be classed as "backlog" and will be consummated in the next 6 or 8 weeks and how much is definitely lost no one can tell, but a considerable part of it certainly will be placed in the near future. Unless further unforeseen circumstances arise, the volume in the 2nd quarter should be particularly heavy.

From the foregoing it should not be assumed that business was in the doldrums last month. Despite floods, retail trade jumped ahead of February by about 10%, taking the country as a whole. Wholesale trade, specially in the seasonal Easter items, was satisfactory. After a particularly bad February, sales of automobiles are again climbing at an encouraging rate and dealers are getting business that was temporarily held up by the severe cold weather. Car production for March is estimated at 400,000 units. Steel production reached 62% capacity in the last week of March, a 6-year peak.

Process Industries Expand

Many of the industries which are heavy consumers of chemicals are stepping up production schedules. After a delayed start, the paint field is swinging into a very active season; the fertilizer mixers are busy, but there is divergence of opinion as to how profitable this season's tonnages will be. The textile, tanning and glass industries are more active and tire production is again improving following the settlement of the strike at the Goodyear plant in Akron. Paper manufacturers report an increase in current shipments.

Mixed Trends Reported

Most of the commodity markets firmed up in the 1st few days of April, but in March nearly all of the accepted indices showed losses. Carloadings in the last half of the month dropped below the totals for the corresponding weeks of '35. Electrical consumption, however, continued to show substantial gains.

Many important industrial plants were damaged by the floods last month and the total losses caused by the high waters ran into millions of dollars. While business was at a standstill for several days in these sections, the job of rebuilding is going ahead fast and should add additional volume to the normal sales totals in nearly all lines.

Chemical shipments in March showed a decided improvement over February and January, yet many executives in the industry are of the belief that last month's volume will not prove to be the largest for the 1st half of the year. The price structure has held up rather firmly. The sensational shortage of crude naphthalene continued and sharp advances were made in cresylic. On the other hand, the alcohol markets were competitive. Very few price changes were reported in those items (mainly raw paint materials) which are contracted for quarterly. The shellac market broke wide open last month.

Chinawood started to climb again and carried along with it several of the competing paint oils. According to those close to the linseed markets, a firmer price structure is inevitable. Changes in naval stores were mostly downward, the market for turpentine being particularly soft. Refined cottonseed oil quotations changed very little in the 30-day period.

Chemical engineers contemplating attending the international meeting in London this summer, held in conjunction with the World Engineering Congress, will be interested in knowing that the majority of those going will sail in *Samaria* on June 12th.

Statistics of Business

	February 1936	February 1935	January 1936	January 1935	December 1935	December 1934
Automotive production	218,270	220,162	276,350	204,015	321,266	183,187
Bldg. contracts*‡	$142,050	$75,047	$204,793	$99,774	$264,136	$92,685
Failures, Dun & Bradstreet	856	971	1,077	1,146	940	963
Merchandise imports‡	$192,821	$152,491	$185,408	$168,482	z$186,863	$132,258
Merchandise exports‡	$182,630	$162,999	$195,564	$173,560	z$223,515	$170,654
Newsprint Production						
Canada, tons	221,569	180,305	227,955	201,959	244,732	239,544
U. S., tons	72,252	70,805	79,361	80,666	75,869	79,777
Newfoundland, tons	24,047	24,604	26,348	28,012	26,833	24,394
Mexico, tons	171	1,743	171	2,066	696	1,820
Total, tons	318,039	277,457	333,835	312,703	348,130	345,535
Plate glass prod., sq. ft. ...	13,856,937	13,723,151	17,275,632	13,265,188	16,112,218	.....
Steel ingots production	2,967,803	2,777,765	3,049,439	2,871,531	3,081,807	1,964,257
Steel activity, % capacity..	54.09	52.28	z51.46	48.04	55.68	35.68
Pig iron production, tons ..	1,827,972	1,608,552	2,025,885	1,477,336	2,016,000	1,027,000
U. S. consumption, crude rubber, tons	.....	.....	.....	.....	42,942	36,569
Tire shipments	.....	.....	3,874,764	3,662,615	4,153,807	3,108,552
Tire production	.....	.....	4,578,710	4,626,473	4,051,286	3,778,418
Tire inventory	.....	.....	8,918,177	10,397,667	8,195,863	9,454,985
Dept. of Labor Indices†						
Factory payrolls, totals† ..	72.3	69.1	72.2	z64.3	76.6	63.2
Factory employment†	83.2	81.4	z83.0	z78.8	84.6	78.1
Chemical employment†a ..	109.1	109.4	z109.7	108.2	111.4	108.3
Chemical payrolls†a	97.5	93.2	97.9	90.5	z99.8	89.9
Chemicals and Related Products						
Exports‡	$8,959	$7,503	$9,096	$7,767	$8,873	$8,478
Imports‡	$7,849	$6,108	$5,955	$6,738	$6,482	$4,437
Stocks, mfd. goods	.....	.....	.....	.....	120	116
Stocks, raw materials† ..	.....	.....	.....	.....	106	116
Cement prod., ratio of prod. to capacity	16.4	14.9	16.1	14.1	25.6	19.5
Anthracite prod., tons	6,461,000	4,505,000	y5,129,000	5,691,000	y4,620,000	4,687,000
Bituminous prod., tons ...	41,375,000	34,834,000	y36,600,000	34,681,000	y34,829,000	32,526,000

Week Ending	Carloadings 1936	Carloadings 1935	Carloadings % of Change	Electrical Output§ 1936	Electrical Output§ 1935	Electrical Output§ % of Change	Jour. of Com. Price Index	‡‡Labor Dept. National Chem. & Drugs	Fertilizer Assoc. Indices Fert. Mat.	Fertilizer Assoc. Indices Mixed Fert.	Fertilizer Assoc. Indices All Groups	Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
Feb. 29.....	673,123	604,331	+11.4	1,903,363	1,734,338	+ 9.7	79.3	94.9	65.3	71.9	77.0	79.7	52.9	....	120.1
Mar. 7.....	634,828	587,190	+ 8.1	1,893,311	1,724,131	+ 9.8	79.4	94.9	65.3	71.9	76.9	79.4	53.5	94.0	120.7
Mar. 14.....	616,862	597,431	+ 3.3	1,900,803	1,728,323	+10.0	79.3	94.2	65.3	71.9	76.7	79.0	55.8	94.5	121.3
Mar. 21.....	566,808	607,178	— 6.7	1,862,387	1,724,763	+ 8.0	79.3	94.2	65.3	71.4	76.9	79.0	60.0	....	121.2
Mar. 28.....	600,487	616,520	— 2.6	1,867,093	1,712,863	+ 9.0	79.0	94.2	65.3	71.4	77.0	....	53.7	....	121.1

* 37 states; † Dept. of Labor, 3 year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; a Includes all allied products but not petroleum refining; ‡‡ 1926-1928 = 100.0; y Preliminary; z Revised.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1935 Average $1.21 - Jan. 1935 $1.23 - Mar. 1936 $1.21

	Current Market	1936 Low	1936 High	1935 Low	1935 High
Acetaldehyde, drs, c-l, wgs lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks .....lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs..lb.	.38	.43	.38	.43	.38	.43
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.24	.26
Acetic Anhydride, 100 lb cbys .....lb.	.21	.25	.21	.25	.21	.25
Acetin, tech, drs .....lb.	.22	.24	.22	.24	.22	.24
Acetone, tks, delv .....lb.	...	.08½	.08½	.12	.11	.12
drs, c-l, delv .....lb.	...	.09½	.09½	.12	...	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls .....lb.	.06¾	.07	.06¾	.07	.06¾	.07
Acetic, 28%, 400 lb bbls, c-l, wks .....100 lbs.	...	2.45	...	2.45	2.40	2.45
glacial, bbls, c-l, wks 100 lbs.	...	8.43	...	8.43	8.25	8.43
glacial, USP, bbls, c-l, wks .....100 lbs.	...	12.43	...	12.43	12.25	12.43
Adipic, kgs, bbls .....lb.	...	.72	...	.72	...	.72
Anthranilic, refd, bbls ....lb.	.85	.95	.85	.95	.85	.95
tech, bbls .....lb.	...	.75	...	.75	...	.75
Battery, cbys, delv ...100 lbs.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb kgs ..lb.	.40	.45	.40	.45	.40	.45
USP, 100 lb kgs .....lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv .....ton *a*	...	95.00	...	95.00	80.00	95.00
Broenner's, bbls .....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 95%, cbys .....lb.	.53	.60	.53	.60	.53	.60
edible, c-l, wks, cbys ...lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs .....lb.	...	.22	...	.22	...	.22
wks .....lb.	...	.23	...	.23	...	.23
tks, wks .....lb.	...	.21	...	.21	...	.21
Camphoric, drs .....lb.	...	5.25	...	5.25	...	5.25
Chicago, bbls .....lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks .....lb.	.03½	.05	.03½	.05	.03½	.05½
Chromic, 99¾%, drs, delv lb.	.14¾	.16¾	.14¾	.16¾	.13¾	.16¾
Citric, USP, crys, 230 lb bbls .....lb. *b*	.27	.28	.27	.29	.28	.29
anhyd, gran, drs .....lb. *b*	...	.30	.30	.31	...	.31
Cleve's, 250 lb bbls .....lb.	.52	.54	.52	.54	.52	.54
Cresylic, 99%, straw, HB, drs, wks, frt equal ..gal.	.58	.59	.51	.59	.46	.53
99%, straw, LB, drs, wks, frt equal .....gal.	.68	.70	.68	.70	.64	.68
resin grade, drs, wks, frt equal .....gal.	.52	.53	.52	.53	.52	.55
Crotonic, drs .....lb.	.90	1.00	.90	1.00	.90	1.00
Formic, tech, 140 lb drs ..lb.	.11	.13	.11	.13	.11	.13
Fumaric, bbls .....lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)						
Fuoric, tech, 90%, 100 lb drs .....lb.	...	.35	...	.35	...	.35
Gallic, tech, bbls .....lb.	.65	.68	.65	.68	.65	.68
USP, bbls .....lb.	.70	.80	.70	.80	.70	.80
Gamma, 225 lb bbls, wks..lb.	.80	.84	.80	.84	.77	.79
H, 225 lb. bbls, wks.....lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol. cbys .....lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 48% com 155 lb cbys, wks .....lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, see muriatic.						
Hydrocyanic, cyl. wks ....lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks .....lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks .....lb.	.11	.12	.11	.12	.11	.12
Lactic, 22%, dark, 500 lb. bbls .....lb.	.04½	.05	.04½	.05	.04½	.05
22%, light refd, bbls ...lb.	.06½	.07	.06½	.07	.06½	.07
44%, light, 500 lb bbls ..lb.	.11½	.12	.11½	.12	.11½	.12
44%, dark, 500 lb bbls ..lb.	.09½	.10	.09½	.10	.09½	.10
50%, water white, 500 lb bbls .....lb.	...	.14½	...	.14½	...	...
USP X, 85%, cbys ....lb.	.45	.50	.45	.50	.45	.50
Laurent's, 250 lb bbls ....lb.	.46	.47	.46	.47	.36	.37
Linoleic, bbls .....lb.	.16	.16	.16	.16	.16	.16
Maleic, powd, kgs .....lb.	.29	.32	.29	.32	.29	.32
Malic, powd, kgs .....lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls ....lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks .....N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls .....lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks .....100 lb.	...	1.35	...	1.35	...	1.35
tks, wks .....100 lb.	...	1.00	...	1.00	...	1.00
Muriatic (cont.):						
20°, cbys, c-l, wks ..100 lb.	...	1.45	...	1.45	...	1.45
tks, wks .....100 lb.	...	1.20	...	1.20	...	1.20
22°, c-l, cbys, wks ..100 lb.	...	1.95	...	1.95	...	1.95
tks, wks .....100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys .....lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls .....lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s. v., drs .....lb.	.11	.14	.11	.14	.11	.14
Sludges, drs .....lb.	.06	.10	.06	.10	...	...
Naphthionic, tech, 250 lb bbls .....lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks .....100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks..100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks..100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks..100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv.....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N. Y. .....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Phosphoric, 50%, USP, cbys .....lb.	.14	.14	.14	.14	.14	.14
50%, acid, c-l, drs, wks..lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks..lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks.lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks .....lb.	.30	.40	.30	.40	.30	.40
Propionic, 98% wks, drs..lb.	...	.35	...	.35	...	.35
80% .....lb.	.15	.17½	.15	.17½	.15	.17½
Pyrogallic, crys, kgs, wks..lb.	1.55	1.65	1.55	1.65	1.55	1.65
Salicylic, tech, 125 lb bbls, wks .....lb.	...	.40	...	.40	...	.40
Sebacic, tech, drs, wks ....lb.	...	.58	...	.58	...	.58
Succinic, bbls .....lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.18	.19	.18	.19	.18	.19
Sulfuric, 60°, tks, wks ..ton	...	11.00	...	11.00	...	11.00
c-l, cbys, wks ....100 lb.	...	1.10	...	1.10	...	1.10
66°, tks, wks .....ton	...	15.50	...	15.50	...	15.50
c-l, cbys, wks ....100 lb.	...	1.35	...	1.35	...	1.35
CP, cbys, wks .....lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks .....ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran powd, 300 lb bbls .....lb.	...	.24	...	.24	.24	.25
Tobias, 250 lb bbls .....lb.	.70	.72½	.70	.72½	.70	.80
Trichloroacetic bottles ....lb.	2.45	2.75	2.45	2.75	2.45	2.75
kgs .....lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls .....lb.	1.50	1.60	1.50	1.60	1.50	1.60
Vanadic, drs, wks .....lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls .....lb.	.50	.60	.50	.60	.45	.60
dark, bbls .....lb.	.12	.17	.12	.17	.12	.17
egg, edible .....lb.	.79	.81	.79	1.05	.85	1.05
vegetable, edible .....lb.	.65	.70	.65	.70	.65	.70
ALCOHOLS						
Alcohol, Amyl (from Pentane) tks, delv .....lb.	...	.143	...	.143	...	...
c-l, drs, delv .....lb.	...	.150	...	.150	...	...
lcl, drs, delv .....lb.	...	.157	...	.157	...	...
Amyl, secondary, tks, delv .....lb.	...	.108	...	.108	...	.108
Benzyl, bottles .....lb.	.65	1.10	.65	1.10	.65	1.10
Butyl, normal, tks, delv lb. *d*	...	.09½	.09½	.11	.11	.12
c-l, drs, delv .....lb. *d*	...	.10½	.10½	.12	.12	.13
Butyl, secondary, tks, delv .....lb. *d*	...	.07½	.07½	.096	...	.096
c-l, drs, delv .....lb. *d*	...	.08½	.08½	.106	...	.106
Capryl, drs, tech, wks ..lb.	...	.85	...	.85	...	.85
Cinnamic, bottles .....lb.	3.25	3.65	3.25	3.65	3.25	3.65
Denatured, No. 5, c-l, drs, wks .....gal. *e*	...	.40	.40	.44	.34	.49
Western schedule, c-l, wks .....gal. *e*	...	.48	.48	.52	.38	.52
Denatured, No. 1, tks, wks .....gal. *e*	...	.28	...	.28	.29½	.31
c-l, drs, wks .....gal. *e*	...	.34	...	.34	.34½	.36
Western schedule, tks, wks .....gal. *e*	...	.34	...	.34	.32½	.35
c-l, drs, wks .....gal. *e*	...	.39	...	.39	.37½	.40
Diacetone, tech, tks, delv .....lb. *f*	...	.16	...	.16	...	.16
c-l, drs, delv .....lb. *f*	...	.17	...	.17	...	.17

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case; * Dealers are given 20% off this price.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

		Current Market	1936 Low	1936 High	1935 Low	1935 High
Alcohols (continued)						
Ethyl, 190 proof, molasses, tks	gal. *g*	...	4.07	4.07	4.10	4.08½ 4.10
c-l, drs	gal. *g*	...	4.12	4.12	4.27	4.13½ 4.27
c-l, bbls	gal. *g*	...	4.13	4.13	4.28	4.15½ 4.28
absolute, drs	gal. *g*	4.54	6.08½	4.54	6.11½	4.55½ 6.11½
Furfuryl, tech, 500 lb, drs	lb.	...	.35	...	.35	... .35
Hexyl, secondary tks, delv	lb.	...	.11½	...	.11½	... .11½
c-l, drs, delv	lb.	...	.12½	...	.12½	... .12½
Normal, drs, wks	lb.	3.25	3.50	3.25	3.50	3.25 3.50
Isoamyl, prim, cans, wks	lb.	...	.32	...	.32	... ...
drs, lcl, delvd	lb.	...	.27	...	.27	... ...
Isobutyl, refd, lcl, drs	lb.	...	.12	...	.12	.12 .60
c-l, drs	lb.	...	.11½	...	.11½	... ...
tks	lb.	...	.10½	...	.10½	... ...
Isopropyl, refd, c-l, drs	lb.	...	.55	...	.55	... .55
Prepyl, norm, 50 gal drs	gal.	...	.75	...	.75	... .75
Special Solvent, tks, wks	gal.	...	.29	.29	.32	... ...
Western points, tks, wks	gal.	...	.35	...	.35	... ...
Aldehyde ammonia, 100 gal drs	lb.	.80	.82	.80	.82	.80 .82
Alphanaphthol, crude, 300 lb bbls	lb.	.60	.65	.60	.65	.60 .65
Alphanaphthylamine, 350 lb bbls	lb.	.32	.34	.32	.34	.32 .34
Alum, ammonia, lump, c-l, bbls, wks	100 lb.	...	3.00	...	3.00	... 3.00
25 bbls or more, wks	100 lb.	...	3.15	...	3.15	... 3.15
less than 25 bbls, wks	100 lb.	...	3.25	...	3.25	... 3.25
Granular, c-l, bbls, wks	100 lb.	...	2.75	...	2.75	... 2.75
25 bbls or more, wks	100 lb.	...	2.90	...	2.90	... 2.90
Powd, c-l, bbls, wks	100 lb.	...	3.15	...	3.15	... 3.15
25 bbls or more, wks	100 lb.	...	3.30	...	3.30	... 3.30
Chrome, bbls	100 lb.	7.00	7.25	7.00	7.25	7.00 7.25
Potash, lump, c-l, bbls, wks	100 lb.	...	3.25	...	3.25	... 3.25
25 bbls or more, wks	100 lb.	...	3.40	...	3.40	... 3.40
Granular, c-l, bbls, wks	100 lb.	...	3.40	...	3.40	... 3.00
25 bbls or more, bbls, wks	100 lb.	...	3.00	...	3.00	... 3.15
Powd, c-l, bbls, wks	100 lb.	...	3.40	...	3.40	... 3.40
25 bbls or more, wks	100 lb.	...	3.55	...	3.55	... 3.55
Soda, bbls, wks	100 lb.	4.00	4.15	4.00	4.15	4.00 4.15
Aluminum metal, c-l, NY	100 lb.	19.00	20.00	19.00	20.00	19.00 23.30
Acetate, CP, 20%, bbls	lb.	.09	.10	.09	.10	.09 .10
Chloride anhyd, 99%, wks	lb.	.07	.12	.07	.12	.07 .12
93%, wks	lb.	.05	.08	.05	.08	.05 .08
Crystals, c-l, drs, wks	lb.	.06½	.07	.06½	.07	.06½ .07
Solution, drs, wks	lb.	.03	.03½	.03	.03½	.03 .03½
Hydrate, 96%, light, 90 lb. bbls, delv	lb.	.13	.15	.13	.15	.13 .15
heavy, bbls, wks	lb.	.04	.04½	.04	.04½	.04 .04½
Oleate, drs	lb.	...	.15¾	...	.15¾	... .15¾
Palmitate, bbls	lb.	.21	.22	.21	.22	.20 .22
Resinate, pp., bbls	lb.	...	.15	...	.15	... .15
Stearate, 100 lb bbls	lb.	.18	.20	.18	.20	.17 .20
Sulfate, com, c-l, bgs, wks	100 lb.	...	1.35	...	1.35	... 1.35
c-l, bbls, wks	100 lb.	...	1.55	...	1.55	... 1.55
Sulfate, iron-free, c-l, bgs, wks	100 lb.	...	1.90	...	1.90	... 1.90
c-l, bbls, wks	100 lb.	...	2.05	...	2.05	... 2.05
Aminoazobenzene, 110 lb kgs	lb.	...	1.15	...	1.15	... 1.15
Ammonia anhyd com, tks	lb.	.04½	.05½	.04½	.05½	.04½ .05½
Ammonia anhyd, 100 lb cyl	lb.	.15¼	.21½	.15¼	.21½	.15¼ .21½
26°, 800 lb drs, delv	lb.	.02½	.03	.02½	.03	.02½ .03
Aqua 26°, tks, NH	cont.	...	.05	...	.05	... .05
tk wagon	lb.	...	.024	...	.024	... .024
Ammonium Acetate, kgs	lb.	.26	.33	.26	.33	.26 .33
Bicarbonate, bbls, f.o.b. plant	100 lb.	5.15	5.71	5.15	5.71	5.15 5.71
Bifluoride, 300 lb bbls	lb.	.15	.17	.15	.17	.15 .17
carbonate, tech, 500 lb bbls	lb.	.08	.12	.08	.12	.08 .12
Chloride, White, 100 lb bbls, wks	100 lb.	4.45	4.90	4.45	4.90	4.45 4.90
Gray, 250 lb bbls, wks	lb.	5.00	5.75	5.00	5.75	5.00 5.75
Lump, 500 lbs cks spot	lb.	.10½	.11	.10½	.11	.10½ .11
Lactate, 500 lb bbls	lb.	.15	.16	.15	.16	.15 .16
Linoleate	lb.	.11	.12	.11	.12	.11 .12
Nitrate, tech, cks	lb.	.04	.05	.04	.05	.04 .05
Oleate, drs	lb.	...	.10	...	.10	... .10
Oxalate, neut, cryst, powd, bbls	lb.	.26	.27	.26	.27	.26 .27
pure, cryst, bbls, kgs	lb.	.27	.28	.27	.28	.27 .28
Perchlorate, kgs	lb.	...	.16	...	.16	... .16
Persulfate, 112 lb kgs	lb.	.22½	.25	.22½	.25	.22½ .25
Phosphate, dibasic tech, powd, 325 lb bbls	lb.	.07½	.10	.07½	.10	.08 .10
Sulfate, dom, f.o.b., bulk	ton	23.00	25.00	22.00	25.00	20.00 24.00
200 lb bgs	ton	...	nom.	...	nom.	25.50 25.80
100 lb bgs	lb.	...	nom.	...	nom.	26.00 26.50
Sulfocyanide, kgs	lb.	...	.55	...	.55	... .50
Amyl Acetate (from pentane) tks, delv	lb.	...	.13½	...	.13½	... .13½
tech, drs, delv	lb.	.142	.149	.142	.149	.142 .149
secondary, tks, delv	lb.	...	.108	...	.108	... .108
c-l, drs, delv	lb.	.118	.123	.118	.123	.118 .123
Amyl Chloride, norm drs, wks	lb.	.56	.68	.56	.68	.56 .68
Chloride, mixed, drs, wks	lb.	.07	.077	.07	.077	.07 .077
tks, wks	lb.	...	.06	...	.06	... .06
Mercaptan, drs, wks	lb.	...	1.10	...	1.10	... 1.10

g Grain alcohol 20c a gal. higher in each case.

		Current Market	1936 Low	1936 High	1935 Low	1935 High
Amylene, drs, wks	lb.	.102	.11	.102	.11	.102 .11
tks, wks	lb.	...	.09	...	.09	... .09
Aniline Oil, 960 lb drs and tks	lb.	.15	.17½	.15	.17½	.15 .17½
Annatto fine	lb.	.34	.37	.34	.37	.34 .37
Anthracene, 80%	lb.	...	.75	...	.75	... .75
40%	lb.	...	.18	...	.18	... .18
Anthraquinone, sublimed, 125 lb bbls	lb.	.50	.52	.50	.52	.50 .52
Antimony metal slabs, ton lots	lb.	.13⅛	.13½	.12½	.13½	.12½ .16
Needle, powd, bbls	lb.	.12	.12½	.12	.12½	.09 .13½
Butter of, see Chloride.						
Chloride, soln cbys	lb.	.13	.17	.13	.17	.13 .17
Oxide, 500 lb bbls	lb.	.13½	.13¾	.13½	.14	.10¼ .15
Salt, 63% to 65%, tins	lb.	.22	.24	.22	.24	.22 .24
Sulfuret, golden, bbls	lb.	.22	.23	.22	.23	.19 .23
Vermilion, bbls	lb.	.35	.42	.35	.42	.35 .42
Archil, conc, 600 lb bbls	lb.	.21	.27	.21	.27	.21 .27
Double, 600 lb bbls	lb.	.18	.20	.18	.20	.18 .20
Triple, 600 lb bbls	lb.	.18	.20	.18	.20	.18 .20
Argols, 80%, casks	lb.	.14	.15	.14	.15	.15 .16
Crude, 30%, casks	lb.	.07	.08	.07	.08	.07 .08
Aroclors, wks	lb.	.18	.30	.18	.30	.18 .30
Arrowroot, bbl	lb.	.08¾	.09¾	.08¾	.09¾	.08¾ .09¾
Arsenic, Red, 224 lb cs kgs	lb.	...	.15¾	...	.15¾	... .15¾
White, 112 lb kgs	lb.	.03½	.04½	.03½	.04½	.03½ .04½
Metal	lb.	.40	.42	.40	.42	.40 .42
Asbestine, c-l, wks	ton	13.00	15.00	13.00	15.00	13.00 15.00
Barium Carbonate precip, 200 lb bgs, wks	ton	56.50	61.00	56.50	61.00	56.50 61.00
Nat (witherite) 90% gr, c-l, wks, bgs	ton	42.00	45.00	42.00	45.00	42.00 45.00
Chlorate, 112 lb kgs NY	lb.	.15½	.17½	.15½	.17½	.14 .17½
Chloride, 600 lb bbl, wks	ton	72.00	74.00	72.00	74.00	72.00 74.00
Dioxide, 88%, 690 lb drs	lb.	.11	.12	.11	.12	.11 .12
Hydrate, 500 lb bbls	lb.	.05½	.06	.05½	.06	.05½ .06
Nitrate, 700 lb cks	lb.	...	.08¼	...	.08¼	... .08¼
Barytes, floated, 350 lb bbls wks	ton	23.65	31.15	23.65	31.15	23.00 31.15
Bauxite, bulk, mines	ton	7.00	10.00	7.00	10.00	7.00 10.00
Bentonite, c-l, No. 1, bgs, wks	ton	...	16.50	...	16.50	16.50 18.00
No. 2	ton	...	11.00	...	11.00	11.00 12.50
Benzaldehyde, tech, 945 lb drs, wks	lb.	.60	.62	.60	.62	.60 .62
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed	gal.	...	.18	...	.18	.15 .18
90% c-l, drs	gal.	...	.23	...	.23	.23 .24
Ind Pure, tks, frt allowed	gal.	...	.18	...	.18	.15 .18
Benzidine Base, dry, 250 lb bbls	lb.	.72	.74	.72	.74	.67 .69
Benzoyl Chloride, 500 lb drs	lb.	.40	.45	.40	.45	.40 .45
Benzyl Chloride, tech, drs	lb.	.30	.40	.30	.40	.30 .40
Beta-Naphthol, 250 lb bbl, wks	lb.	.24	.27	.24	.27	... .24
Naphthylamine, sublimed, 200 lb bbls	lb.	1.25	1.35	1.25	1.35	1.25 1.35
Tech, 200 lb bbls	lb.	.53	.55	.53	.55	.53 .55
Bismuth metal		1.00	1.10	1.00	1.10	.90 1.20
Chloride, boxes	lb.	3.20	3.25	3.20	3.25	3.20 3.25
Hydroxide, boxes	lb.	3.15	3.20	3.15	3.20	3.15 3.20
Oxychloride, boxes	lb.	2.95	3.00	2.95	3.00	2.95 3.00
Subbenzoate, boxes	lb.	3.25	3.30	3.25	3.30	3.25 3.30
Subcarbonate, kgs	lb.	1.40	1.45	1.40	1.45	1.55 1.70
Trioxide, powd, boxes	lb.	3.45	3.50	3.45	3.50	3.45 3.50
Subnitrate		1.30	1.35	1.30	1.35	1.30 1.45
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks	ton *h*	42.50	70.00	42.50	70.00	42.50 70.00
Bleaching Powder, 800 lb drs, c-l, wks, contract	100 lb.	...	2.00	...	2.00	1.90 2.00
lcl, drs, wks	lb.	2.25	3.60	2.25	3.60	2.15 3.60
Blood, dried, f.o.b., NY	unit	...	3.00	3.00	3.20	2.50 3.25
Chicago, high grade	unit	...	3.25	3.25	3.50	2.50 3.75
Imported shipt	unit	...	2.70	2.70	3.05	2.75 3.30
Blues, Bronze Chinese Milori						
Prussian Soluble	lb.	.37	.38½	.37	.38½	.36½ .38
Ultramarine,* dry, wks, bbls	lb.	...	.10	...	.10	... ...
Regular grade, group 1	lb.	...	.15	...	.15	... ...
Special, group 1	lb.	...	.18	...	.18	... ...
Pulp, No. 1	lb.	...	.26	...	.26	... ...
Bone, 4½ + 50% raw, Chicago	ton	20.00	22.00	20.00	22.00	19.00 22.00
Bone Ash, 100 lb kgs	lb.	.06	.07	.06	.07	.06 .07
Black, 200 lb bbls	lb.	.05½	.08¼	.05½	.08¼	.05½ .08¼
Meal, 3% & 50%, imp.	ton	...	23.00	23.00	23.25	22.75 24.00
Domestic, bgs, Chicago	ton	17.00	19.00	17.00	20.00	16.00 21.00
Borax, tech, gran, 80 ton lots, sacks, delv	ton *i*	...	40.00	...	40.00	36.00 40.00
bbls, delv	ton *i*	...	50.00	...	50.00	46.00 50.00
c-l, sacks, delv	ton *i*	...	44.00	...	44.00	40.00 44.00
c-l, bbls, delv	ton *i*	...	54.00	...	54.00	50.00 54.00
Tech, powd, 80 ton lots, sacks	ton *i*	...	45.00	...	45.00	41.00 45.00
bbls, delv	ton *i*	...	56.00	...	56.00	51.00 56.00
c-l, sacks, delv	ton *i*	...	49.00	...	49.00	45.00 49.00
c-l, bbls, delv	ton *i*	...	59.00	...	59.00	55.00 59.00
Bordeaux Mixture, jobbers, East, c-l, tins, drs, cases	lb.	.08	.16	.08	.16	.08 .16
Jobbers, West, c-l	lb.	.08	.10	.08	.10	.08 .10
Dealers, East, c-l	lb.	.08½	.16½	.08½	.16½	.08½ .16½
Dealers, West, c-l	lb.	.09	.11	.09	.11	.09 .11

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

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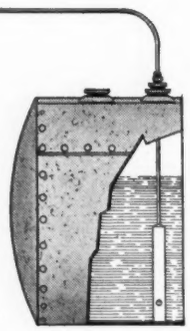

Bromine
Chromium Fluoride

Prices

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Bromine, cases ....lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.80	1.50	.80	1.50	.80	1.50
Gold, blk ....lb.	.40	.55	.40	.55	.40	.55
Butanes, com 16-32° group 3 tks ....lb.	...	.04	...	.04	...	.04
Butyl, Acetate, norm drs, frt allowed ....lb.	.10½	.11	.10½	.12½	.12	.13½
tks, frt allowed ....lb.	...	.09½	.09½	.11	.11	.13
Secondary, tks, frt allowed ....lb.	...	.07½	.07½	.096	...	.096
drs, frt, allowed ....lb.	.08½	.09	.106	.111	.106	.111
Aldehyde, 50 gal drs, wks ....lb.	.19	.21	.19	.21	.19	.21
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Lactate, drs ....lb.	.22½	.23½	.22½	.23½	.22½	.23½
Propionate, drs ....lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv ....lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs ....lb.	...	.26	...	.26	...	.26
Tartrate, drs ....lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes...lb.	1.00	1.10	1.00	1.10	.75	.85
Cadmium Metal ....lb.	...	1.05	.85	1.05	.55	.90
Calcium, Acetate, 150 lb bgs c-l, delv ....100 lb.	...	2.10	...	2.10	2.00	2.10
Arsenate, jobbers, East of Rocky Mts, drs ....lb.	.06	.06⅜	.06	.06⅜	.06	.06½
dealers, drs ....lb.	.06¼	.07¾	.06¼	.07¾	.06¼	.07¾
South, jobbers, drs ....lb.	.06	.06½	.06	.06½	.06	.06½
dealers, drs ....lb.	.06½	.06¾	.06½	.06¾	.06¼	.06¾
Carbide, drs ....lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l ....lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs, c-l, wks ....ton	...	19.50	...	19.50	...	19.50
Solid, 650 lb drs, c-l, f.o.b. wks ....ton	...	17.50	...	17.50	...	17.50
Ferrocyanide, 350 lb bbls wks ....lb.	...	.17	...	.17	...	.17
Gluconate, tech, 125 lb bbls ....lb.	...	.28	...	.28	...	.28
Nitrate, 100 lb bgs ....ton	...	26.50	...	26.50	...	26.50
Palmitate, bbls ....lb.	.21	.22	.21	.22	.20	.22
Peroxide, 100 lb drs ....lb.	...	1.25	...	1.25	...	1.25
Phosphate, tech, 450 lb bbls ....lb.	.07½	.08	.07½	.08	.07½	.08
Resinate, precip, bbls ...lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ...lb.	.18	.20	.18	.20	.17	.20
Camphor, slabs ....lb.	.55	.56	.55	.56	.49	.57
Powder ....lb.	.55	.56	.55	.56	.50	.57
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16	.18
Carbon, Decolorizing, drs c-l ....lb.	.08	.15	.08	.15	.08	.15
Black, c-l, bgs, delv, price varying with zone ....lb.	.0445	.0535	.0445	.0535	.0445	.0535
lcl, bgs, delv, all zones lb.	...	.07	...	.07	...	.07
cartons, delv ....lb.	...	.07¾	...	.07¾	...	.07¾
cases, delv ....lb.	...	.08¼	...	.08¼	...	.08¼
Bisulfide, 500 lb drs ...lb.	.05¼	.08	.05¼	.08	.05¼	.08
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv ....lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd lb.	.15	.16½	.14½	.16¾	.09½	.16¾
80-100 mesh, c-l, bgs....lb.	.15½	.17	.15	.17¼	.10	.17¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks ....ton	...	15.50	...	15.50	16.00	18.50
Imported, ship, bgs ....ton	...	17.50	...	17.50	17.25	20.00
Celluloid, Scraps, ivory cs lb.	.17	.18	.17	.18	.17	.18
Transparent, cs ....lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, 50 lb kgs ....lb.	.55	.60	.55	.60	.55	.60
Chalk, dropped, 175 lb bbls lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks ....lb.	.03	.04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks ....bu.	...	.15	...	.15	...	.15
Willow, powd, 100 lb bbl, wks ....lb.	.06	.06¼	.06	.06¼	.06	.06¼
bgs, delv* ....ton	24.40	25.40	24.40	25.40	22.40	30.00
Chestnut, clarified bbls, wks lb.	...	.01⅞	...	.01⅞	...	.01⅞
25%, tks, wks ....lb.	...	.01½	...	.01½	...	.01½
Pwd, 60%, 100 lb bgs. wks ....lb.	...	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	...	7.00	...	7.00		7.00
Powdered, bbls ....lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls, wks ..ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, blk ...ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks, contract ....lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract ...lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract 100 lb.	...	2.15	...	2.15	2.00	2.15
Multi, c-l, cyls, wks, cont ....lb.	2.30	2.55	2.30	2.55	2.30	2.40
Chloroacetophenone, tins, wks ....lb.	...	2.00	..	2.00	..	2.00
Chlorobenzene, Mono, 100 lb drs, lcl, wks ....lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs ....lb.	.20	.21	.20	.21	20	.21
USP, 25 lb tins ....lb.	.30	.31	.30	.31	30	.31
Chloropicrin; comml cyls..lb.	.85	.90	.85	.90	85	.90
Chrome, Green, CP ....lb.	.17	.18½	.17	.18½	17	.30
Yellow ....lb.	.11	12	.11	.12	11	.16
Chromium, Acetate, 8% Chrome, bbls ....lb.	.06	08	.06	.08	06	.05¾
20° soln, 400 lb bbls .. lb.		05½		05		.05½
Fluoride, powd, 400 lb bbl ....lb.	27	28	27	28	27	.28

j A delivered price; * Depends upon point of delivery

Current

		Current Market	1936 Low	1936 High	1935 Low	1935 High
Coal tar, bbls	bbl.	7.25	9.00	7.25	9.00	7.25	9.00
Cobalt Acetate, bbls	lb.	...	.58	.58	.60	...	.60
Carbonate tech, bbls	lb.	1.35	1.40	1.35	1.40	1.35	1.40
Hydrate, bbls	lb.	1.66	1.76	1.66	1.76	1.66	1.76
Linoleate, paste, bbls	lb.	...	.30	...	.30	...	.30
Resinate, fused, bbls	lb.	...	.12½	...	.12½	...	.12½
Precipitated, bbls	lb.	...	.32	...	.32	...	.32
Cobalt Oxide, black, bgs	lb.	1.39	1.49	1.39	1.49	1.25	1.49
Cochineal, gray or bk bgs.	lb.	.32	.36	.32	.36	.32	.39
Teneriffe silver, bgs	lb.	.33	.37	.33	.37	.33	.40
Copper, metal, electrol 100 lb.		...	9.50	...	9.50	8.00	9.25
Carbonate, 400 lb bbls	lb.	...	.08¼	...	.08¼	...	.08¼
52-54% bbls	lb.	.14½	.16¼	.14½	.16¼	.14½	.16¼
Chloride, 250 lb bbls	lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs	lb.	.37	.38	.37	.38	.37	.38
Oleate, precip, bbls	lb.	...	.20	...	.20	...	.20
Oxide, red, 100 lb bbls.	lb.	.14	.15	.14	.15	.15	.17
black bbls, wks	lb.	.14½	.15	.14½	.15	.14	.16½
Resinate, precip, bbls	lb.	.18	.19	.18	.19	.18	.19
Stearate, precip, bbls	lb.	.35	.40	.35	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls	lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.		...	3.85	...	3.85	...	3.85
Copperas, crys and sugar bulk c-l, wks, bgs	ton	13.00	14.00	13.00	14.00	12.00	14.00
Corn Syrup, 42 deg, bbls	100 lb.	...	3.15	3.05	3.15	3.18	3.63
43 deg, bbls	100 lb.	...	3.20	3.10	3.20	3.23	3.68
Corn Sugar, tanners, bbls	100 lb.	...	3.18	3.08	3.18	3.46	3.66
Cotton, Soluble, wet, 100 lb bbls	lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls	lb.	...	.16¾	...	.16¾	.16¼	.17¼
Creosote, USP, 42 lb cbys	lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks	gal.	.12½	.13½	.12½	.13½	.11½	.13½
Grade 2	gal.	.109	.12	.109	.12	.10½	.12
Cresol, USP, drs	lb.	.10	.10½	.10	.10½	.10	.11½
Crotonaldehyde, 98%, 50 gal drs	lb.	.26	.30	.26	.30	.32	.36
Cudbear, English	lb.	.19	.25	.19	.25	.19	.25
Cutch, Philippine, 100 lb bale	lb.	.04	.04¾	.04	.04¾	.03½	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia unit		...	1.07½	...	1.07½	...	1.07½
Dextrin, corn, 140 lb bgs f.o.b., Chicago	100 lb.	3.55	3.75	3.45	3.75	3.60	4.15
British Gum, bgs	100 lb.	3.80	4.10	3.70	4.10	3.85	4.50
White, 140 lb bgs	100 lb.	3.50	3.70	3.40	3.70	3.50	4.10
Potato, Yellow, 220 lb bgs	lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl	lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl	lb.	...	.08	...	.08	.08	.08¾
Diamylamine, drs, wks	lb.	...	1.00	...	1.00	...	1.00
Diamylene, drs, wks	lb.	.095	.102	.095	.102	.095	.102
tks, wks	lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs	lb.	.085	.092	.085	.092	.085	.092
tks, wks	lb.	...	.075	...	.075	...	.075
Diamylphthalate, drs wks	gal.	.18	.19½	.18	.19½	.18	.20½
Diamyl Sulfide, drs, wks	lb.	...	1.10	...	1.10	...	1.10
Dianisidine, bbls	lb.	2.25	2.45	2.25	2.45	2.25	2.45
Dibutylphthalate, drs, wks	lb.	.20	.21	.20	.21	.20	.23
Dibutyltartrate, 50 gal drs	lb.	.35	.40	.35	.40	.35	.40
Dichlorethylene, drs	gal.	.29	...	.29	...	.29	...
Dichloroethylether, 50 gal drs, wks	lb.	.16	.17	.16	.17	.16	.17
tks, wks	lb.	...	.15	...	.15	...	.15
Dichloromethane, drs, wks	lb.	...	.23	...	.23	.15	.23
Dichloropentanes, drs, wks	lb.	.032	.040	.032	.040	.032	.040
tks, wks	lb.	...	.02½	...	.02½	...	.02½
Diethanolamine, tks	lb.	...	.30	...	.30	...	...
Diethylamine, 400 lb drs	lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethyl Carbinol, drs	lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs	lb.	.31⅜	.35	.31⅜	.35	.31⅜	.35
90% grade, drs	lb.	...	.25	...	.25	...	.25
Diethylaniline, 850 lb drs.	lb.	.52	.55	.52	.55	.52	.55
Diethylorthotoluidin, drs	lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb drs	lb.	.18½	.19	.18½	.19	.18½	.27
Diethylsulfate, tech, 50 gal drs	lb.	...	...	...	...	...	...
Diethyleneglycol, drs	lb.	.15½	.17½	.15½	.17½	.15½	.17½
Mono ethyl ethers, drs.	lb.	.15	.17	.15	.17	.15	.17
tks, wks	lb.	...	.15	...	.15	...	.15
Mono butyl ether, drs	lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs, wks	lb.	.20	.24	.20	.24	.20	.27
Diglycol Oleate, bbls	lb.	...	.24	...	.24	.16	.24
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis	lb.	...	.95	...	.95	...	.95
Dimethylaniline, 340 lb drs	lb.	.29	.30	.29	.30	.29	.30
Dimethyl Ethyl Carbinol, drs	lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs	lb.	.20	.21½	.20	.21½	.20½	.24½
Dimethysulfate, 100 lb drs	lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls	lb. *k*	.17	.19½	.17	.19½	.17	.19½
Dinitrochlorobenzene, 400 lb bbls	lb.	.14	.15½	.14	.15½	.14	.15½
Dinitronaphthalene, 350 lb bbls	lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls	lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls	lb.	.15½	.16½	.15½	.16½	.15½	.16½
Diphenyl	lb.	.15	.25	.[illegible]	.25	.15	.25
Diphenylamine	lb.	.31	.32	.[illegible]	.32	.31	.32
Diphenylguanidine, 100 lb bbl	lb.	.35	.37	.35	.37	.36	.37

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H_2SO_4	KOH	NaOH	NaOH
$(NH_4)CNS$	NaOH		
I			
$K_2Cr_2O_7$			
$KBrO_3$			
KOH			
$KMnO_4$			
$AgNO_3$			
Na_2HAsO_3			
$NaBrO_3$			
Na_2CO_3			
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Dip Oil
Glycerin

Prices

	Current Market	1936 Low	1936 High	1935 Low	1935 High
Dip Oil, see Tar Acid Oil.					
Divi Divi pods, bgs shipmt ton	42.00	45.00	34.00	45.00	36.00	40.00
Extract .....lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, dom., 200 lb cases .....lb.	...	.68	.63	.68	.46	.63
Imported .....lb.	.51	.53	.51	.56	...	...
Epsom Salt, tech, 300 lb bbls c-l NY .....100 lb.	1.80	2.00	1.80	2.00	1.80	2.25
USP, c-l, bbls .....100 lb.	...	2.00	...	2.00	2.00	2.25
Ether, USP anaesthesia 55 lb drs .....lb.	.22	.23	.22	.23	.22	.23
(Conc) .....lb.	.09	.10	.09	.10	.09	.10
Ether, Isopropyl 50 gal drs lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed .....lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles ...lb.	.75	.77	.75	.77	.75	.77
Synthetic, wks, drs ....lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks .....lb.	.07½	.08	.07½	.08	.07½	.08
drs .....lb.	.08½	.09	.08½	.09	.08½	.09
Anhydrous, tks .....lb.	...	.08½	...	.08½	...	.08½
drs .....lb.	.09½	.10	.09½	.10	.09½	.10
Acetoacetate, 50 gal drs lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drs .....lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drs ....lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate cbys ...lb.	...	.30	...	.30	...	.30
Crotonate, drs .....lb.	1.00	1.25	1.00	1.25	1.00	1.25
Ether, Absolute, 50 gal drs .....lb.	.50	.52	.50	.52	.50	.52
Lactate, drs, wks .....lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs, frt allowed .....lb.	.08½	.09	.08½	.09	.08½	.09
tks, frt allowed .....lb.	...	.07½	...	.07½	...	.07½
Oxalate, drs, wks .....lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs, wks .....lb.	.30	.30½	.30	.30½	.30	.30½
Ethylene Dibromide, 60 lb drs .....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont .....lb.	.75	.85	.75	.85	.75	.85
Anhydrous .....lb.	...	.75	...	.75	...	...
Dichloride, 50 gal drs ..lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks lb.	.17	.21	.17	.21	.17	.28
tks, wks .....lb.	...	.16	...	.16	...	...
Mono Butyl Ether, drs, wks .....lb.	.20	.21	.20	.21	.20	.21
tks, wks .....lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks .....lb.	.16	.17	.16	.17	.16	.17
tks, wks .....lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks .....lb.	.17½	.18½	.17½	.18½	.17½	.18½
tks, wks .....lb.	...	.16½	...	.16½	...	.16½
Mono, Methyl Ether, drs wks .....lb.	.19	.23	.19	.23	.19	.23
tks, wks .....lb.	...	.18	...	.18	...	...
Stearate .....lb.	.18	.18	.18	.18	.18	.18
Oxide, cyl .....lb.	.55	.60	.55	.60	.55	.75
Ethylidenaniline .....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery ....ton	..	14.50	..	14.50	...	14.50
Powd, blk, wks .....ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls .....lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys .....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks .....unit *l*	...	nom.	...	nom.	2.25	2.90
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis .....unit *m*	...	2.25	...	2.25	2.00	2.35
Fluorspar, 98%, bgs .....lb.	30.00	35.50	30.00	35.50	28.00	35.50
Formaldehyde, USP, 400 lb bbls, wks .....lb.	.06	.07	.06	.07	.06	.07
Fossil Flour .....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines .....ton	6.50	15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs ....ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks..lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs .....lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.18	.16	.18	.16	.18
Fustic, chips .....lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes...lb.	.20	.23	.20	.23	.20	.23
Liquid 50°, 600 lb bbls..lb.	.08½	.12	.08½	.12	.08½	.12
Solid, 50 lb boxes.....lb.	.16	.18	.16	.18	.16	.18
Sticks .....ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls...lb.	.45	.47	.45	.47	.42	.43
Gall Extract .....lb.	.18	.20	.18	.20	.18	.20
Gambier, com 200 lb bgs..lb.	...	.06	...	.06	.05	.08
Singapore cubes, 150 lb bgs .....100 lb.	.08	.09	.08	.09	.07⅛	.09¼
Gelatin, tech, 100 lb cs ..lb.	.50	.55	.50	.55	.50	.55
Glauber's Salt, tech, c-l, wks .....100 lb.	1.10	1.30	1.10	1.30	1.10	1.30
Anhydrous, see Sodium Sulfate.						
Glucose (grape sugar) dry 70-80° bgs, c-l, NY ..100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb bgs .....100 lb.	...	2.33	...	2.33	...	2.33
Glue, bone, com grades, c-l bgs .....lb.	.10½	.17½	.10½	.17½	...	...
Better grades, c-l, bgs lb.	.12	.17½	.12	.17½	...	...
Casein, kgs .....lb.	.18	.22	.18	.22	.18	.22
Glycerin, CP, 550 lb drs ..lb.	.16	.17	.16	.17	.14	.14½
Dynamite, 100 lb drs ...lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
Saponification, drs .....lb.	.10¼	.11½	.10¼	.11½	.10	.11½
Soap Lye, drs .....lb.	.09¼	.09½	.09¼	.09½	.09	.10

l + 10; *m* + 50.

		Current Market	1936 Low	1936 High	1935 Low	1935 High
Glyceryl Phthalate	lb.	...	.28	...	.28	...	.28
Glyceryl Stearate, bbls	lb.	...	.18	...	.18	...	.18
Glycol Phthalate	lb.	...	.29	...	.29	.28	.29
Glycol Stearate	lb.	...	.23	...	.23	.18	.23
Graphite:							
Crystalline, 500 lb bbls	lb.	.04	.05	.04	.05	.04	.05
Flake, 500 lb. bbls	lb.	.08	.16	.08	.16	.08	.16
Amorphous, bbls	lb.	.03	.04	.03	.04	.03	.04
GUMS							
Gum Aloes, Barbadoes	lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts	lb.	.10	.10½	.10¼	.10¾	.09½	.15
White sorts, No. 1, bgs	lb.	.25	.27	.25	.27	.21	.27
No. 2, bgs	lb.	.24	.26	.24	.26	.19	.26
Powd, bbls	lb.	.13	.14	.13	.14	.13¼	.18
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY	lb.	.02½	.10½	.02½	.10½	.02½	.10½
Egyptian, 200 lb cases, f.o.b., NY	lb.	.12	.15	.12	.15	.12	.15
California, f.o.b., NY, drs	ton	29.00	55.00	29.00	55.00	29.00	55.00
Benzoin Sumatra, USP, 120 lb cases	lb.	.18	.19	.18	.19	.19	.28
Copal, Congo, 112 lb bgs, clean, opaque	lb.	.19½	.20	.19½	.20	.19½	.24⅝
Dark amber	lb.	.07½	.08	.07½	.08	.07¼	.09¼
Light amber	lb.	.13⅝	.14⅛	.13⅜	.14⅛	.11½	.14⅞
Copal, East India, 180 lb bgs							
Macassar pale bold	lb.	.13⅜	.14	.13⅜	.14	.09½	.10¾
Chips	lb.	.06⅛	.06½	.06⅛	.06½	.05½	.06
Nubs	lb.	...	.10⅞	...	.10⅞	...	...
Dust	lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04½
Singapore							
Bold	lb.	.16⅜	.16⅞	.16⅜	.16⅞	.12⅜	.17
Chips	lb.	.04¾	.05¼	.04¾	.05¼	.04⅝	.05⅝
Nubs	lb.	.10⅜	.11¼	.10⅜	.11¼	.10	.11¾
Dust	lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.05½
Copal Manilla, 180-190 lb baskets, Loba A	lb.	.12½	.13	.12½	.13	.11¾	.13
Loba B	lb.	.11⅛	.12	.11⅛	.12	.10¼	.12
Loba C	lb.	.10⅜	.11⅛	.10⅜	.11⅛	.10⅜	.11½
MA sorts	lb.	.07⅛	.07⅝	.07⅛	.07⅝	.06	.07⅝
DBB	lb.	.08⅜	.08⅞	.08⅜	.08⅞	.08	.09
Dust	lb.	.05⅝	.06⅛	.05⅝	.06⅛	.04⅞	.06⅛
Copal Pontianak, 224 lb cases, bold genuine	lb.	.15½	.16	.15½	.16	.14⅜	.16⅝
Mixed	lb.	.13¼	.13¾	.13¼	.13¾	.12⅞	.14⅞
Chips	lb.	.07⅜	.07⅞	.07	.07⅞	.06⅞	.08¼
Nubs	lb.	.10¼	.10½	.10¼	.10½	.09⅝	.11¾
Split	lb.	.12⅞	.13	.12⅞	.13	.12⅜	.13⅞
Dammar Batavia, 136 lb cases							
A	lb.	.21¾	.22¼	.21⅜	.22¼	.19	.21⅞
B	lb.	.20¾	.21½	.20⅜	.21½	.18	.20⅞
C	lb.	.17⅛	.17⅝	.16½	.17⅝	.16	.17
D	lb.	.14¼	.14⅜	.13⅝	.14⅜	.11¾	.14⅛
A/D	lb.	.16¼	.17	.15½	.17	.14	.16
A/E	lb.	.13⅝	.14¼	.13	.14¼	.11¾	.13¾
E	lb.	.06¾	.07¼	.06¾	.07¼	.07	.07¼
F	lb.	.06⅜	.06⅞	.06⅜	.06⅞	.06⅜	.06⅞
Singapore							
No. 1	lb.	.17	.17½	.17	.17½	.15⅝	.19
No. 2	lb.	.13¾	.14¼	.13¾	.14¼	.10⅝	.14⅞
No. 3	lb.	.05¼	.05¾	.05¼	.05¾	.04⅝	.05⅞
Chips	lb.	.09¾	.09¾	.09¾	.09¾	.08⅞	.09¾
Dust	lb.	.05⅛	.05⅝	.05⅛	.05⅝	.04¾	.05⅞
Seeds	lb.	.06⅝	.06¾	.06⅝	.06¾	.04¾	.07¼
Ester	lb.	.07⅝	.08⅜	.07⅝	.08⅜	.07¼	.08⅜
Elemi, cons	lb.	.09¾	.10¼	.09¾	.10¼	...	...
Gamboge, pipe, cases	lb.	.58	.59	.58	.59	.55	.65
Powd, bbls	lb.	.65	.66	.65	.66	.65	.75
Ghatti, sol. bgs	lb.	.11	.15	.11	.15	.09	.15
Karaya, powd, bbls, xxx	lb.	.24	.25	.24	.25	.23	.25
xx	lb.	.16	.17	.16	.17	.15	.17
No. 1	lb.	.09½	.10	.09½	.10	.08	.10
No. 2	lb.	.08½	.09	.08½	.09	.07	.09
Kauri, NY, San Francisco, Brown XXX, cases	lb.	.60	.60½	.60	.60½	.60	.60½
BX	lb.	.33	.33½	.33	.33½	.33	.33½
B1	lb.	.19	.19½	.19	.19½	.19	.19½
B2	lb.	.14½	.15	.14½	.15	.14½	.15
B3	lb.	.12	.12½	.12	.12½	.12	.12½
Pale XXX	lb.	.65	.65½	.65	.65½	.65	.65½
No. 1	lb.	.40	.40½	.40	.40½	.40	.40½
No. 2	lb.	.22	.22½	.22	.22½	.22	.22½
No. 3	lb.	.15	.15½	.15	.15½	.15	.15½
Kino, tins	lb.	.70	.80	.70	.80	.70	.80
Mastic	lb.	.60	.60½	.60	.60½	.46	.60½
Sandarac, prime quality, 200 lb bgs & 300 lb cks	lb.	.26¼	.26½	.26¼	.26½	.26¼	.35½
Senegal, picked bgs	lb.	.20	.21	.20	.21	.20	.21
Sorts	lb.	.11½	.12½	.11½	.12½	.09⅜	.12½
Thus, bbls	280 lbs.	...	11.00	...	11.00	10.50	11.00
Strained	280 lbs.	...	11.00	...	11.00	10.50	11.00
Tragacanth, No. 1, cases	lb.	1.25	1.30	1.20	1.30	1.15	1.30
No. 2	lb.	1.15	1.20	1.10	1.20	1.05	1.20
No. 3	lb.	1.00	1.05	.95	1.05	.95	1.05
No. 4	lb.	.90	.95	.85	.95	.85	.95
No. 5	lb.	.80	.85	.75	.85	.75	.85
No. 6, bgs	lb.	.21	.25	.18	.25	.14	.19
Sorts, bgs	lb.	.30	.35	.25	.30	.11	.25
Yacca, bgs	lb.	.03¼	.03¾	.03¼	.03¾	.03¼	.03¾

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Helium
Meta-nitro-paratoluidine

Prices

	Current Market	1936 Low	1936 High	1935 Low	1935 High
Helium, cyl (200 cu. ft.) cyl.	... 25.00	... 25.00		... 25.00	
Hematite crystals, 400 lb bbls .....lb.	.16	.16	.18	.16	.18
Paste, 500 bbls .....lb.	... .11	... .11		... .11	
Hemlock, 25%, 600 lb bbls, wks .....lb.	... .02⅞	... .02⅞		... .02⅞	
tks .....lb.	... .02½	... .02½		... .02½	
Hexalene, 50 gal drs, wks lb.	... .30	... .30		... .30	
Hexane, normal 60-70°C. Group 3, tks .....gal.	... .12	... .12		... .14	
Hexamethylenetetramine, drs .....lb.	.37 .39	.37	.39	.37	.39
Hexyl Acetate, delv, drs ..lb.	.12 .12½	.12	.12½	.12	.12½
tks .....lb.	... .11½	...	.11½	...	.11½
Hoof Meal, f.o.b. Chicago unit	... 2.50	...	2.50	2.50	2.70
Hydrogen Peroxide, 100 vol, 140 lb cbys .....lb.	.20 .21	.20	.21	.20	.21
Hydroxyamine Hydrochloride .....lb.	... 3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.17 .20	.17	.20	.17	.20
Indigo, Madras, bbls .....lb.	1.25 1.30	1.25	1.30	1.25	1.30
20% paste, drs .....lb.	.15 .18	.15	.18	.15	.18
Synthetic, liquid .....lb.	.13 .14	.13	.14	...	.12
Iodine, Resublimed, kgs...lb.	1.65 1.75	1.65	1.75	...	1.90
Irish Moss, ord, bales ....lb.	.09 .10	.09	.10	.09	.10
Bleached, prime, bales ..lb.	.18 .19	.18	.19	.18	.19
Iron Acetate Liq. 17°, bbls lb.	.03 .04	.03	.04	.03	.04
Chloride see Ferric Chloride.					
Nitrate, coml, bbls ..100 lb.	2.75 3.25	2.75	3.25	2.75	3.25
Oxide, English .....lb.	.07½ 08¾	.07½	.08¾	.07½	.08¾
Isobutyl Carbinol (128-132°C) drs, wks .....lb.	.33 .34	.33	.34	.33	.34
tks, wks .....lb.	... .32	...	.32	...	.32
Isopropyl Acetate, tks ....lb.	... .07½	...	.07½	...	.07½
drs, frt allowed .....lb.	.08½ .09	.08½	.09	.08½	.09
Ether, see Ether, isopropyl.					
Keiselguhr, 95 lb bgs, NY, Brown .....ton	60.00 70.00	60.00	70.00	60.00	70.00
Lead Acetate, brown, broken, f.o.b. NY, bbls .....lb.	... .09½	...	.09½	...	.09½
White, broken, bbls ..lb.	... .11	...	.11	...	.11
cryst, bbls .....lb.	... .10½	...	.10½	...	.10½
gran, bbls .....lb.	... .11	...	.11	...	.11
powd, bbls .....lb.	... .11¼	...	.11¼	...	.11¼
Arsenate, East, jobbers, drs .....lb.	.09 .09⅜	.09	.09⅜	.09	.09½
Dealers, drs .....lb.	.09¼ .10¾	.09¼	.10¾	.09¼	.10¾
West, jobbers, drs .....lb.	... .09	...	.09	...	.09
dealers, drs .....lb.	... .10	...	.10	...	.10
Linoleate, solid, bbls ...lb.	.26 .26½	.26	.26½	.26	.26½
Metal, c-l, NY .....100 lb.	... 4.60	4.50	4.60	3.50	4.50
Red, dry, 95% Pb_3O_4, delv .....lb.	.0735 ...	.07	.08	.06	.08
97% Pb_3O_4, delv ....lb.	.0760 ...	.07¼	.08¼	.06¼	.08¼
98% Pb_3O_4, delv ....lb.	... .0810	.07½	.08½	.06½	.08½
Nitrate, 500 lb bbls, wks lb.	.09 .09½	.09	.09½	.10	.14
Oleate, bbls .....lb.	.15 .16	.15	.16	.15	.16
Resinate, precip, bbls ..lb.	... .14	...	.14	...	.14
Stearate, bbls .....lb.	.22 .23	.22	.23	.22	.23
White, 500 lb bbls, wks..lb.	.06½ .07	.06½	.07	.06½	.07
Sulfate, 500 lb bbls, wks lb.	... .06	...	.06	...	.06
Lime, chemical quicklime, f.o.b., wks, bulk ....ton	7.00 7.25	7.00	7.25	7.00	7.25
Hydrated, f.o.b., wks ..ton	9.00 12.00	8.50	12.00	8.50	12.00
Lime Salts, see Calcium Salts.					
Lime sulfur, dealers, tks..gal.	... .11	...	.11	.10½	.11
drs .....gal.	.13 .16	.13	.16	.13	.16½
Dry, bgs, jobbers.....lb.	.07¼ .10¼	.07¼	.10¼	...	...
Linseed Meal, bgs .....ton	... 29.00	...	30.00	25.50	40.00
Litharge, coml, delv, bbls..lb.	.0610 .07	.06	.07	.05	.07
Lithopone, dom, ordinary, delv, bgs .....lb.	.04½ .04¾	.04½	.04¾	.04½	.04¾
bbls .....lb.	.04¾ .05	.04¾	.05	.04¾	.05
High strength, bgs .....lb.	.06 .06¼	.06	.06¼	.06	.06¼
bbls .....lb.	.06¼ .06½	.06¼	.06½	.06¼	.06½
Titanated, bgs .....lb.	.06 .06¼	.06	.06½	.06	.06¼
bbls .....lb.	.06¼ .06½	.06¼	.06½	.06¼	.06½
Logwood, 51°, 600 lb bbls lb.	.08½ .10½	.08½	.10½	.08½	.10½
Solid, 50 lb boxes .....lb.	.13½ .17½	.13½	.17½	.13½	.17½
Sticks .....ton	24.00 26.00	24.00	26.00	24.00	26.00
Madder, Dutch .....lb.	.22 .25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00 65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks .....lb.	.06 .06½	.06	.06½	.06	.06½
Chloride flake, 375 lb drs, c-l, wks .....ton	36.00 39.00	36.00	39.00	36.00	39.00
Magnesium fluosilicate, crys, 400 lb bbls, wks .....lb.	.10 .10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls .....lb.	... .42	...	.42	...	.42
Heavy, 250 lb bbls ..lb.	... .50	...	.50	...	.50
Palmitate, bbls .....lb.	.23 .24	.23	.24	.22	.24
Stearate, bbls .....lb.	.20 .22	.20	.22	.19	.22
Linoleate, lig drs .....lb.	.18 .19	.18	.19	.18	.19
Resinate, fused, bbls ...lb.	.08¼ .08½	.08¼	.08½	.08¼	.08½
precip, bbls .....lb.	... .12	...	.12	...	.12
Manganese Borate, 30%, 200 lb bbls .....lb.	.15 .16	.15	.16	.15	.16
Chloride, 600 lb cks ....lb.	.09 .12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l .....ton	... 47.50	...	47.50	45.00	50.00
Mangrove, 55%, 400 lb bbls lb.	... .04	...	.04	...	.04
Bark, African .....ton	26.50 27.00	26.00	27.00	26.00	30.00
Marble Flour, blk .....ton	12.00 13.00	12.00	13.00	12.00	13.00
Mercuric chloride .....lb.	.81 .83	.81	.83	.71	.93
Mercury metal ...76 lb. flasks	78.00 80.00	77.00	80.00	69.00	77.00
Meta-nitro-aniline .....lb.	.67 .69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls .....lb.	1.40 1.55	1.40	1.55	1.40	1.55

Current

Meta-phenylene-diamine
Orthodichlorobenzene

	Current Market	1936 Low	1936 High	1935 Low	1935 High
Meta-phenylene-diamine 300 lb bbls ..... lb.	.80	.80	.84	.80	.84
Peroxide, 100 lb cs ..... lb.	1.20	1.20	1.25	1.20	1.25
Silicofluoride, bbls ..... lb.	.09	.09	.10	.09	.10
Stearate, bbls ..... lb.	.19	.19	.20	.19	.20
Meta-toluene-diamine, 300 lb bbls ..... lb.	.67	.67	.69	.67	.69
Methanol, 95%, frt allowed, drs ..... gal. *o*	.37½	.37½	.58	.37½	.58
tks, frt allowed .... gal. *o*	.33	.33	.36½	.33	.36½
97% frt allowed, drs gal. *o*	.38½	.38½	.59	.38½	.59
tks, frt allowed .... gal. *o*	.34	.34	.37½	.34	.37½
Pure, frt allowed, drs gal. *o*	.40	.40	.61	.40	.61
tks, frt allowed .... gal. *o*	.35½	.35½	.39	.35½	.39
Synthetic, frt allowed, drs ..... gal. *o*	.40	.40	.61	.40	.61
tks, frt allowed .... gal. *o*	.35½	.35½	.39	.35½	.39
Methyl Acetate, dom, 98-100%, drs ..... lb.	.16	.11	.18½	.18	.18½
Synthetic, 410 lb drs ... lb.	.16	.16	.17	.16	.17
tks ..... lb.	...	...	.15	...	.15
Acetone, frt allowed, drs ..... gal. *p*	.48½	.48½	.68½	.49½	.73½
tks, frt allowed, drs gal. *p*	.44	.44	.47½	.44	.52½
Synthetic, frt allowed, east of Rocky M., drs gal. *p*	.57½	.57½	.60	.57½	.60
tks, frt allowed.... gal.	...	...	.53	...	.53
West of Rocky M., frt allowed, drs .... gal. *p*	.66	.66	.69	.66	.69
tks, frt allowed .. gal. *p*	...	...	.63½	...	.63½
Hexyl Ketone, pure, drs lb.	...	...	.60	...	.60
Anthraquinone ..... lb.	.65	.65	.67	.65	.67
Butyl Ketone, tks ..... lb.	...	...	.10½	...	.10½
Chloride, 90 lb cyl ..... lb.	...	...	.45	...	.45
Ethyl Ketone, tks ..... lb.	...	...	.07½	...	.07½
Propyl carbinol, drs .... lb.	.60	.60	.75	.60	.75
Mica, dry grd, bgs, wks .. lb.	35.00	35.00	...	35.00	...
Michler's Ketone, kgs .... lb.	...	...	2.50	...	2.50
Molasses, blackstrap, tks, f.o.b. NY ..... gal.	.08	.08	.08¼	.07¾	.08¼
Monoamylamine, drs, wks lb.	...	...	1.00	...	1.00
Monochlorobenzene, see Chlorobenzene, mono.					
Monoethanolamine, tks, wks lb.	...	...	.30	...	...
Monomethylparaminosulfate, 100 lb drs ..... lb.	3.75	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls.. lb.	...	...	.04¼	...	.04¼
50% Solid, 50 lb boxes lb.	.06	.06	.06¼	.06	.06¼
J1 bgs ..... ton	22.75	22.75	24.00	23.50	27.00
J2 bgs ..... ton	...	...	14.50	15.00	15.75
R2 bgs ..... ton	...	...	14.00	16.00	16.50
Naphtha, v.m.&p. (deodorized) see petroleum solvents.					
Naphtha, Solvent, water-white, tks ..... gal.	...	...	.31	.26	.30
drs, c-l ..... gal.	...	...	.36	.31	.35
Naphthalene, dom, crude, bgs, wks ..... lb.	4.00	3.50	4.00	1.65	3.00
Imported, cif, bgs .... lb.	...	...	...	1.90	3.00
Dyestuffs, bgs, bbls, Eastern wks ..... lb.	.06	.06	.07	.04¼	.07
Balls, flakes, pks ..... lb.	...	...	.07¼	...	...
Balls, ref'd, bbls, Eastern wks ..... lb.	...	...	.06¾	.04½	.06¾
Flakes, ref'd, bbls, Eastern wks ..... lb.	...	...	.06¾	.04½	.06¾
Dyestuffs, bgs, bbls, Mid-West wks ..... lb. *q*	.06½	.06½	.07½	.04¾	.07½
Balls, ref'd, bbls, Mid-West wks ..... lb. *q*	...	...	.07¼	.05	.07½
Flakes, ref'd, bbls, Mid-West wks ..... lb. *q*	...	...	.07¼	.05	.07¼
Nickel Carbonate, bbls.... lb.	...	...	.36	.35	.36
Chloride, bbls ..... lb.	.18	.18	.19	.18	.19
Oxide, 100 lb kgs, NY.. lb	.35	.35	.37	.35	.37
Salt, 400 lb bbls, NY .. lb.	.13	.13½	.13½	.12½	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13½	.11½	.13½
Metal ingot ..... lb.	...	...	.35	...	.35
Nicotine, free 50%, 8 lb tins, cases ..... lb.	8.25	8.25	10.15	8.25	10.15
Sulfate, 55 lb drs ..... lb.	.75	.75	1.17	.67	.80
Nitre Cake, blk ..... ton	12.00	12.00	14.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks ..... lb.	.09	.09	.11	.09	.11
tks ..... lb.	...	...	.08½	...	.08½
Nitrocellulose, c-l-l c-l, wks lb.	.29½	.29½	.34	.27	.34
Nitrogenous Mat'l, bgs, imp unit	2.20	2.20	2.25	2.20	2.75
dom, Eastern wks .... unit	1.90	1.90	2.25	2.20	2.40
dom, Western wks .... unit	...	...	1.90	1.90	2.30
Nitronaphthalene, 550 lb bbls lb.	.24	.24	.25	.24	.25
Nutgalls Aleppy, bgs .... lb.	.16	.16	.18	.12	.18
Chinese, bgs ..... lb.	.19	.19	.20	.19	.20
Oak Bark Extract, 25%, bbls lb.	...	...	.03½	...	.03½
tks ..... lb.	...	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ... lb.	...	...	.15	...	...
Orange-Mineral, 1100 lb cks NY ..... lb.	.10	.10	.10½	.09¼	.10½
Orthoaminophenol, 50 lb kgs. lb.	2.15	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.82	.82	.84	.82	.84
Orthochlorophenol, drs .... lb.	.50	.50	.65	.50	.65
Orthocresol, drs ..... lb.	.13	.13	.15	.13	.15
Orthodichlorobenzene, 1000 lb drs ..... lb.	.06½	.05½	.11½	.05½	.06

o Country is divided in 5 zones, prices varying by zone. In drum prices range covers both zone and c-l and lcl quantities in the 5 zones; in each case, bbl. prices are 2½c higher; synthetic is not shipped in bbls.; *p* Country is divided into 5 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

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Orthonitrochlorobenzene
Phloroglucinol

Prices

	Current Market	1936 Low	1936 High	1935 Low	1935 High
Orthonitrochlorobenzene, 1200 lb drs, wks ....lb.	.28	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs, wks ....lb.	.07	.07	.10	.05½	.10
Orthonitrophenol, 350 lb drs ....lb.	.52	.52	.80	.52	.80
Orthotoluidine, 350 lb bbls, l-c-l ....lb.	.14½	.14½	.15	.14½	.15
Orthonitroparachlorphenol, tins ....lb.	.70	.70	.75	.70	.75
Osage Orange, cryst ....lb.	.17	.17	.25	.17	.25
51 deg liquid ....lb.	.07	.07	.07¾	.07	.07¾
Powd, 100 lb bgs ....lb.	.14½	.14½	.15	.14½	.15
Paraffin, rfd, 200 lb cs slabs 122-127 deg M P ....lb.	.0445	.0445	.04½	.04	.04¼
128-132 deg M P ....lb.	.04¾	.04¾	.049	.05	.0515
133-137 deg M P ....lb.	.05½	.05½	.05¾	.0575	.06
Para aldehyde, 110-55 gal drs ....lb.	.16	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ....lb.	...	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ....lb.	1.25	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	...	1.05	...	1.05
Chlorophenol, drs ....lb.	.50	.50	.65	.50	.65
Coumarone, 330 lb drs ..lb.	...	...	...	...	...
Cymene, refd, 110 gal dr ....gal.	2.25	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks ....lb.	.16	.16	.20	.16	.20
Formaldehyde, bbls, wks lb.	.38	.38	.39	.38	.39
Nitroacetanilid, 300 lb bbls ....lb.	.45	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ....lb.	.47	.47	.51	.48	.55
Nitrochlorobenzene, 1200 lb drs, wks ....lb.	.23½	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ....lb.	2.75	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.45	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb bbls ....lb.	.92	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	.36	.36	.37	.35	.37
Phenylenedamine, 350 lb bbls ....lb.	1.25	1.25	1.30	1.25	1.30
Para Tertiary amyl phenol, wks, drs ....lb.	.32	.32	.50	.32	.50
Toluenesulfonamide, 175 lb bbls ....lb.	.70	.70	.75	.70	.75
tks, wks ....lb.	...	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ....lb.	.20	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ....lb.	.58	.58	.60	.56	.60
Paris Green, Arsenic Basis 100 lb kgs ....lb.	...	...	.24	...	.24
250 lb kgs ....lb.	...	...	.22	...	.22
Perchlorethylene, 50 gal drs ....lb.	...	...	.15	...	.15
Persian Berry Ext, bbls ..lb.	.55	.55	Nom.	.55	Nom.
Pentane, normal, 28-38°C, group 3, tks....gal.	...	...	.09	...	.09
drs, group 3 ....gal.	.10	.10	.15	.10	.15
Petrolatum, dark amber, bbls ....lb.	.02⅝	.02⅝	.02⅞	.02	.02⅞
Light, bbls ....lb.	.03⅛	.03⅛	.03⅜	.02½	.03⅜
Medium, bbls ....lb.	.02⅞	.02⅞	.03⅛	.02¼	.03⅛
Dark green, bbls ....lb.	.02½	.02½	.02¾	.02½	.02¾
White, lily, bbls ....lb.	.06	.06	.06¼	.05¼	.06½
White, snow, bbls ....lb.	.07	.07	.07¼	.06¼	.07½
Red, bbls ....lb.	.02⅝	.02⅛	.02⅝	.02⅛	.02¼	.02⅞
Petroleum Ether, 30-60°, group 3, tks ....gal.	...	...	.13	...	.13
drs, group 3 ....gal.	.15	.15	.16	.15	.16

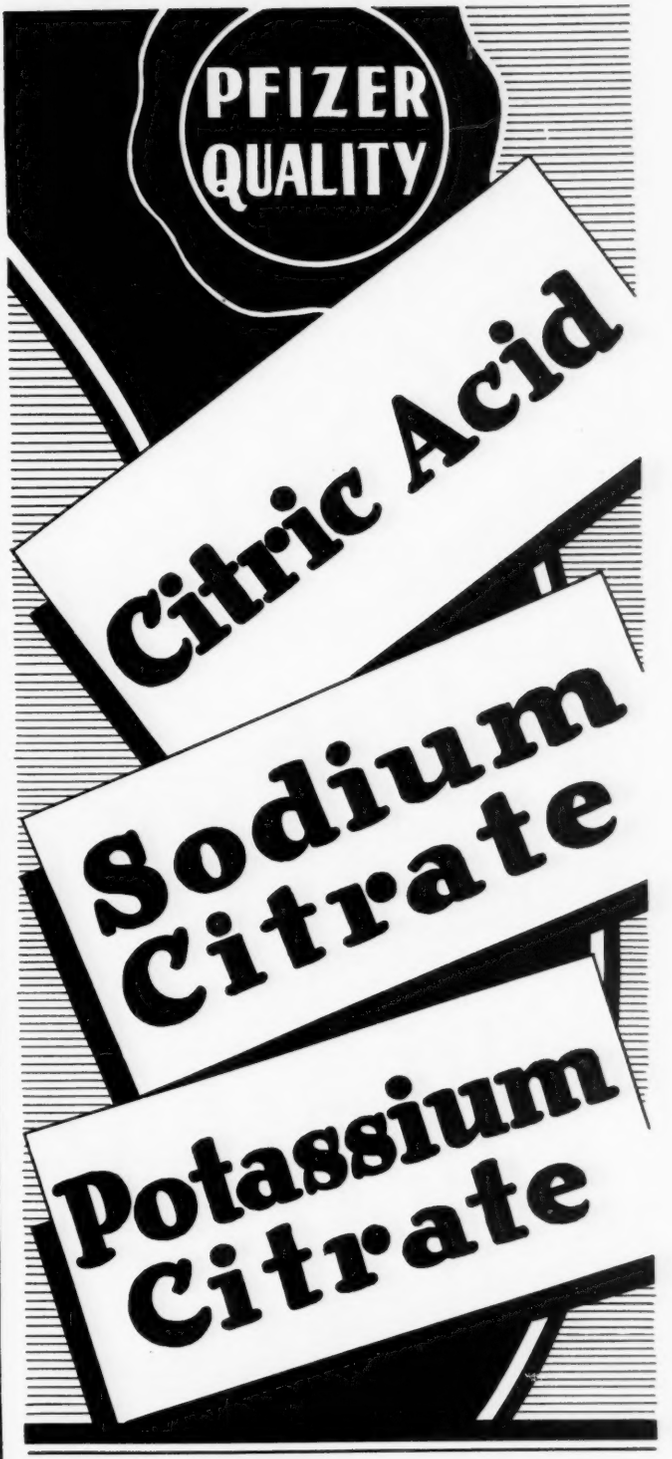
PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks ....gal.	.07⅜	.07	.07½	.07⅜	.06⅞	.07¼
Bayonne, tks, wks ..gal.	...	.09	.09½	...	...	.09
West Coast, tks ....gal.	...	.15	...	.15	...	.15
Hydrogenated, naphthas, frt allowed East, tks ....gal.	...	.16	...	.16	.15	.17½
No. 2, tks ....gal.	...	.18	...	.18	.18	.22½
No. 3, tks ....gal.	...	.15	...	.15	.15	.17½
No. 4, tks ....gal.	...	.18	...	.18	.18	.22½
Lacquer diluents, tks Bayonne ....gal.	.12	.12	.12½	.12	.12	.12½
Group 3, tks ....gal.	.08⅜	.08	.08⅜	.08½	.07⅞	.08
Naphtha, V.M.P., East, tks, wks ....gal.	...	.09	...	.09	...	.09
Group 3, tks, wks ...gal.	.07⅜	.07	.07⅜	.07½	.06⅞	.07¼
Petroleum thinner, East, tks, wks ....gal.	...	.09	.09	.09½	...	.09
Group 3, tks, wks ..gal.	.06⅜	.06⅝	.06⅜	.06⅝	.05⅞	.06¼
Rubber Solvents, stand grd, East, tks, wks ....gal.	...	.09	.09	.09½	...	.09
Group 3, tks, wks ..gal.	.07⅜	.07	.07⅜	.07½	.06⅞	.07¼
Stoddard Solvent, East, tks, wks ....gal.	...	.09	.09	.09½	...	.09
Group 3, tks, wks ...gal.	.06⅞	.07	.06⅞	.07	.06⅜	.07
Phenol, 250-100 lb drs ....lb.	.14¼	.15	.14¼	.15	.14¼	.15
Phenyl-Alpha-Naphthylamine, 100 lb kgs ....lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ....lb.	...	.16	...	.16	...	.16
Phenylhydrazine Hydrochloride ....lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phloroglucinol, tech, tins ..lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins ....lb.	20.00	22.00	20.00	22.00	20.00	22.00

		Current Market	1936 Low	1936 High	1935 Low	1935 High
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis	ton	1.85	...	1.85	1.85	3.40
70% basis	ton	2.35	...	2.35	2.35	3.90
72% basis	ton	2.85	...	2.85	2.85	4.40
75-74% basis	ton	3.85	...	3.85	3.85	5.40
75% basis	ton	4.35	...	4.35	4.35	5.50
Tennessee, 72% basis	ton	4.50	...	4.50	4.50	4.75
Phosphorous Oxychloride 175 lb cyl	lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases	lb.	.44	.45	.44	.45	.44	.45
Yellow, 110 lb cs, wks	lb.	.28	.33	.28	.33	.28	.33
Sesquisulfide, 100 lb cs	lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl	lb.	.16	.20	.16	.20	.16	.20
Phthalic Anhydride, 100 lb drs, wks	lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls							
Destructive dist	lb.	.44	.46	.44	.46	.44	.50
Steam dist wat wh bbls	gal.	.64	.65	.64	.65	.64	.65
tks	gal.	...	.59	...	.59	...	.59
Straw color, bbls	gal.	...	.59	...	.59	...	.59
tks	gal.	...	.54	...	.54	...	.54
Pitch Hardwood, wks	ton	...	15.00	...	15.00	15.00	20.00
Burgundy, dom, bbls, wks	lb.	...	.03½	...	.03½	...	.03½
Imported	lb.	.11	.13	.11	.13	.11	.13
Coaltar, bbls, wks	ton	...	19.00	...	19.00	...	19.00
Petroleum, see Asphaltum in Gums' Section.							
Pine, bbls	bbl.	4.00	4.50	4.00	4.50	3.75	4.25
Stearin, drs	lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, refd	oz.	34.50	38.00	34.50	38.00	35.00	38.00

POTASH

Potash, Caustic, wks, sol	lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake	lb.	.07	.07⅜	.07	.07⅜	.07	.07⅜
Liquid, tks	lb.	...	.02⅞	...	.02⅞	...	.02⅞
Potash Salts, Rough Kainit 14% basis	ton	...	8.50	...	8.50	...	8.50
Manure Salts, imported							
20% basis, blk	ton	...	11.00	...	11.00	8.60	11.00
30% basis, blk	ton	...	14.40	...	14.40	12.90	14.40
Domestic, cif ports, blk unit		...	.43	...	.43	...	.43
Potassium Acetate	lb.	.26	.28	.26	.28	.26	.28
Potassium Muriate, 80% basis bgs	ton	...	22.50	...	22.50	22.00	22.50
Dom, blk	unit	...	.45	...	.45	.40	.45
Pot & Mag Sulfate, 48% basis bgs	ton	22.25	22.50	22.25	22.50	19.50	22.50
Potassium Sulfate, 90% basis bgs	ton	...	33.75	...	33.75	33.75	35.00
Potassium Bicarbonate, USP 320 lb bbls	lb.	.09	.18	.09	.18	.07½	.09
Bichromate Crystals, 725 lb cks	lb.	.08½	.09	.08½	.09	.08⅛	.09
Binoxalate, 300 lb bbls	lb.	...	.23	...	.23	.22	.23
Bisulfate, 100 lb kgs	lb.	.15½	.18	.15½	.18	.35	.36
Carbonate, 80-85% calc 800 lb cks	lb.	.07¼	.07½	.07¼	.07½	.07½	.07⅞
liquid, tks	lb.	...	.02⅞	...	.02⅞	...	...
drs, wks	lb.	.03⅛	.03¼	.03⅛	.03¼	...	...
Chlorate crys, 112 lb kgs, wks	lb.	.09¼	.09½	.09¼	.09½	...	.09¾
gran, kgs	lb.	.12	.13	.12	.13	.12	.13
powd, kgs	lb.	.08	.08¼	.08	.08¼	.08¼	.09¼
Chloride, crys, bbls	lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs	lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb cases	lb.	.55	.57½	.55	.57½	.55	.57½
Iodide, 75 lb bbls	lb.	...	1.25	...	1.25	1.25	1.40
Metabisulfite, 300 lb bbls	lb.	...	.15	...	.15	...	.15
Oxalate, bbls	lb.	.25	.26	.25	.26	.16	.24
Perchlorate, cks, wks	lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks	lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, 112 lb kgs	lb.	.35	.38½	.35	.38½	.35	.38½
Yellow, 500 lb casks	lb.	.18	.19	.18	.19	.18	.19
Tartrate Neut, 100 lb kgs	lb.	...	.21	...	.21	...	.21
Titanium Oxalate, 200 lb bbls	lb.	.32	.35	.32	.35	.32	.35
Propane, group 3, tks	lb.	...	.03	...	.03	...	.07
Pumice Stone, lump bgs	lb.	.04½	.06	.04½	.06	.04½	.06
250 lb bbls	lb.	.05	.07	.05	.07	.05	.07
Powd, 350 lb bgs	lb.	.02½	.03	.02½	.03	.02½	.03
Putty, coml, tubs	100 lb.	...	2.75	...	2.75	...	2.75
Linseed Oil, kgs	100 lb.	...	4.50	...	4.50	...	4.50
Pyridine, 50 gal drs	gal.	...	1.30	...	1.30	1.20	1.30
Pyrites, Spanish cif Atlantic ports, blk	unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins	lb.	2.40	2.75	2.40	2.75	2.40	3.00
Quebracho, 35% liq tks	lb.	...	.02⅝	...	.02⅝	...	.02⅝
450 lb bbls, c-l	lb.	...	.03½	.03⅛	.03½	...	.03⅛
Solid, 63%, 100 lb bales cif	lb.	...	.03⅝	...	.03⅝	...	.03⅝
Clarified, 64%, bales	lb.	...	.03⅞	...	.03⅞	...	.03⅞
Quercitron, 51 deg liq, 450 lb bbls	lb.	.06	.06½	.06	.06½	.06	.06½
Solid, 100 lb boxes	lb.	.10	.12	.10	.12	.10	.12
R Salt, 250 lb bbls, wks	lb.	.52	.57	.52	.57	.44	.45
Resorcinol tech, cans	lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst	lb.	.14	.14½	.14	.14½	.14	.15
Powd, bbls	lb.	.13	.13½	.13	.13½	.13	.13½
Rosin Oil, bbls, first run	gal.	.41	.42	.41	.42	.36	.45
Second run	gal.	.47	.50	.47	.50	.43	.48
Third run, drs	gal.	.54	.56	.54	.56	.50	.60



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Rosins
Sodium Nitrate

Prices

		Current Market	1936 Low	1936 High	1935 Low	1935 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:						
B	...	4.45*	4.45	4.65	4.65	5.65
D	...	5.00	4.95	5.15	5.02½	5.75
E	...	5.20	5.15	5.30	5.15	5.90
F	...	5.60	5.40	5.60	5.20	5.95
G	...	5.60	5.50	5.75	5.25	6.00
H	...	5.60	5.55	5.85	5.25	6.00
I	...	5.70	5.60	5.85	5.25	6.00
K	...	5.70	5.70	5.00	5.27½	6.05
M	...	5.75	5.75	5.95	5.35	6.10
N	...	5.85	5.85	6.02½	5.75	6.40
WG	...	6.05	6.05	6.35	5.95	6.87½
WW	...	6.65	6.65	6.90	6.25	7.55
Rosins, Gum, Savannah (280 lb unit):						
B	...	3.15*	3.15	3.40	3.40	4.40
D	...	3.75	3.75	3.90	3.70	4.50
E	...	3.90	3.90	4.05	3.90	4.65
F	...	4.25	4.10	4.36	3.95	4.70
G	4.30	4.32½	4.20	4.45	4.00	4.75
H	4.32½	4.35	4.30	4.60	4.00	4.75
I	...	4.35	4.40	4.60	4.00	4.75
K	...	4.40	4.40	4.65	4.02½	4.80
M	...	4.45	4.45	4.70	4.10	4.85
N	...	4.60	4.60	4.80	4.50	5.15
WG	...	4.75	4.75	5.10	4.70	5.60
WW	...	5.40	5.40	5.65	5.15	6.25
X	...	5.40	5.40	5.65	5.20	6.25
Rosins, Wood, wks (280 lb unit), wks, FF	...	4.25	...	4.25	4.05	6.35
I	...	4.70	...	4.70	4.30	7.00
M	...	5.05	5.05	5.10	4.55	7.25
N	...	5.70	5.70	5.75	5.00	7.75
Rosin, Wood. c-l, FF grade, NY	...	5.12	...	5.12	4.92	5.62
Rotten Stone, bgs mines..ton	...	35.00	...	35.00	23.50	35.00
Lump, imported, bbls ...lb.	.05	.07	.05	.07	.05	.07
Selected, bbls. .....lb.	.08	.10	.08	.10	.08	.10
Powdered, bbls .....lb.	.02½	.05	.02½	.05	.02½	.05
Sago Flour, 150 lb bgs ....lb.	.02¾	.03¾	.02¾	.03¾	.02¾	.03¾
Sal Soda, bbls, wks ...100 lb.	...	1.15	1.15	1.30	...	1.30
Salt Cake, 94-96%, c-l, wks ton	13.00	18.00	13.00	18.00	13.00	18.00
Chrome, c-l, wks .....ton	12.00	13.00	12.00	13.00	12.00	13.00
Saltpetre, double refd, gran, 450-500 lb bbls .....lb.	.059	.06¼	.059	.06¼	.059	.06¼
Powd, bbls .....lb.	.069	.07⅞	.069	.07⅞	.069	.07⅞
Cryst, bbls .....lb.	.069	.08	.069	.08	.069	.08
Satin, White, 550 lb bbls..lb.	...	.01½	..	.01½	...	.01½
Shellac, Bone dry, bbls..lb. *r*	.19	.20	.19	.26½	.19	.32
Garnet, bgs .....lb.	.16	.17	.16	.20	.17	.27
Superfine, bgs .....lb. *s*	.15½	.17	.15½	.18	.16	.28
T. N., bgs .....lb. *s*	.14½	.15½	.14	.16	.13	.25
Schaeffer's Salt, kgs .....lb.	.48	.50	.48	.50	.48	.50
Silver Nitrate, vials .....oz.	...	.32⅝	...	.32⅝	.36⅜	.53¼
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks .....100 lb.	...	1.25	...	1.25	...	1.25
58% light, bgs .....100 lb.	...	1.23	...	1.23	...	1.23
blk .....100 lb.	...	1.05	...	1.05	...	1.05
paper bgs .....100 lb.	...	1.20	...	1.20	...	1.20
bbls .....100 lb.	...	1.50	...	1.50	...	1.50
Soda Caustic, 76% grnd & flake, drs .....100 lb.	...	3.00	...	3.00	...	3.00
76% solid, drs .....100 lb.	...	2.60	...	2.60	...	2.60
Liquid sellers, tks, 100 lbs.	...	2.25	...	2.25	...	2.25
Sodium Abietate, drs .....lb.	...	.08	...	.08	...	.08
Acetate, tech, 450 lb bbls, wks .....lb.	.04½	.05	.04½	.05	.04½	.05
Alignate, drs .....lb.	...	.64	...	.64	...	.64
Antimoniate, bbls .....lb.	.12¾	.13¼	.12¾	.14	...	...
Arsenate, drs .....lb.	...	.10½	...	.10½	...	.10½
Arsenite, liq, drs .....gal.	.40	.75	.40	.75	.40	.75
Benzoate, USP, kgs ....lb.	.46	.48	.46	.48	.46	.48
Bicarb, 400 lb bbl, wks 100 lb.	...	1.85	...	1.85	...	1.85
Bichromate, 500 lb cks, wks .....lb.	.06½	.07	.06½	.07	.06⅛	.07
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol cbys, wks 100 lb.	1.95	2.10	1.95	2.10	1.95	2.10
Chlorate, bgs, wks .....lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Chloride, tech .....ton	13.60	16.50	13.60	16.50	13.60	16.50
Cyanide, 96-98%, 100 & 250 lb drs, wks .....lb.	.15½	.17½	.15½	.17½	.15½	.17½
Fluoride, 90%, 300 lb bbls, wks .....lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks .....lb.	.18	.19	.18	.19	.18	.21
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.50	3.00	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks .....100 lb.	2.40	2.75	2.40	2.75	2.40	2.75
Iodide .....lb.	2.00	2.05	2.00	2.05	2.00	2.40
Metanilate, 150 lb bbls..lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks .....100 lb.	2.30	3.30	2.30	3.30	2.65	3.05
cryst, bbls, wks ..100 lb.	...	3.25	...	3.25	...	3.25
Monohydrate, bbls .....lb.	...	.023	...	.023	...	.02½
Napthenate, drs .....lb.	...	.09	...	.09	...	.09
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY .....ton	...	25.80	24.80	25.80	...	24.80
100 lb bgs .....ton	...	26.50	25.50	26.50	...	25.50
Bulk .....ton	...	24.50	23.50	24.50	...	23.50

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.; * Prices as of Mar. 29th.

	Current Market		1936 Low	1936 High	1935 Low	1935 High
Sodium (continued):						
Nitrite, 500 lb bbls .....lb.	.0735	.08	.0735	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks..lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls ..lb.	.17	.18	.17	.18	.17	.19
Peroxide, bbls, 400 lb ..lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.30	...	2.30	2.20	2.30
bgs, wks .....100 lb.	...	2.10	...	2.10	2.00	2.10
tri-sodium, tech, 325 lb bbls, wks .....100 lb.	...	2.30	...	2.30	2.30	2.70
bgs, wks .....100 lb.	...	2.10	...	2.10	2.10	2.60
Picramate, 160 lb kgs ..lb.	.67	.69	.67	.69	.67	.69
Prussiate, Yellow, 350 lb bbl, wks .....lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, anhyd, 100 lb bbls .....lb.	.102	.132	.102	.132	.102	.15
Silicate, 60°, 55 gal drs, wks .....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks .....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY .....lb.	.05¾	.06	.05¾	.06	.04¼	.05
Stannate, 100 lb drs ....lb.	.32½	.34	.32½	.34	.31	.38
Stearate, bbls .....lb.	.22	.26	.21	.26	.20	.25
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-l, wks .....100 lb. ‡	1.30	1.55	1.30	1.55	1.25	2.35
Sulfide, 80% cryst, 440 lb bbls, wks .....lb.	...	.02¼	...	.02¼	...	.02¼
62% solid, 650 lb drs, c-l, wks .....lb.	...	.03	...	.03	...	.03
Sulfite, cryst, 400 lb bbls, wks .....lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, bbls .....lb.	.28	.47	.28	.47	.32	.42½
Tungstate, tech, crys, kgs lb.	.85	.90	.85	.90	...	.90
Spruce Extract, ord, tks...lb.	...	.01	...	.01	...	.01
Ordinary, bbls .....lb.	...	.01½	...	.01½	...	.01½
Super spruce ext, tks....lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, bbls...lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs .....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs .....100 lb.	3.09	3.29	2.99	3.29	3.13	3.78
Powd, 140 lb bgs....100 lb.	3.19	3.39	3.09	3.39	3.23	3.66
Potato, 200 lb bgs.....lb.	.04½	.05½	.04½	.05½	.04½	.06
Imp, bgs .....lb.	.05¾	.06	.05¾	.06	.05¾	.06½
Rice, 200 lb bbls .....lb.	...	.07¼	...	.07¼	.07¼	.08½
Wheat, thick, bgs .....lb.	...	.08¼	...	.08¼	...	.08¼
Strontium carbonate, 600 lb bbls, wks .....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Sucrose octa-acetate, den, grd, bbls, wks .....lb.	.45	...	.45	...	...	...
tech, bbls, wks .....lb.	.40	...	.40	...	...	...
Sulfur	...	...	...	...	...	...
Crude, f.o.b. mines ....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.60	2.35	1.60	2.35	1.60	2.35
bbls .....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs ..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls .....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Superfine, bgs .....100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls .....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs .....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls .....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs .....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls .....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, red, 700 lb drs, wks .....lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs, wks lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl lb.	.06½	.08½	.06½	.08½	.08½	.10
Multiple units, wks ....lb.	.05½	.06	.05½	.06	...	.06½
tks, wks .....lb.	.04½	.04¾	.04½	.04¾	...	.04¾
Refrigeration, cyl, wks ...lb.	.10	.13	.10	.13	...	.13
Multiple units, wks .....lb.	.07	.09¼	.07	.09¼	...	.09¼
Sulfuryl Chloride .....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd .....ton	53.00	54.00	53.00	54.00	50.00	65.00
dom, bgs, wks .....ton	...	35.00	...	35.00	...	35.00
Superphosphate, 16% bulk, wks .....ton	8.25	Nom.	8.25	Nom.	8.25	8.50
Run of pile .....ton	7.75	Nom.	7.75	Nom.	7.75	8.00
Talc, Crude, 100 lb bgs, NY .....ton	14.00	15.00	14.00	15.00	14.00	15.00
Refd, 100 lb bgs, NY ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bgs, NY ton	23.00	30.00	22.00	30.00	22.00	30.00
Refd, white, bgs .....ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	70.00	75.00	70.00	75.00	70.00	75.00
Refd, white, bgs, NY ton	75.00	80.00	75.00	80.00	75.00	80.00
Tankage Grd, NY ....unit ※	...	3.00	2.85	3.10	2.35	3.00
Ungrd .....unit ※	...	2.70	2.60	2.75	2.15	2.50
Fert grade, f.o.b. Chicago .....unit ※	...	2.65	2.65	2.75	2.25	2.65
South American cif..unit ※	...	2.85	2.85	3.15	2.45	3.15
Tapioca Flour, high grade, bgs .....lb.	.03½	.05½	.03½	.05½	.0215	.05
Tar Acid Oil, 15%, drs ..gal.	.22½	.23½	.22½	.23½	.21	.23½
25%, drs .....gal.	.24½	.26½	.24½	.26½	.23	.26½
Tar, pine, delv, drs .....gal.	.25	.26	.25	.26	.25	.26
tks, delv .....gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech .....lb.	.24¾	.25	.24¾	.25	.22¾	.25
USP, bbls .....lb.	.28	.28½	.28	.28½	.28	.28½
Terpineol, den grd, drs ...lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.14¾
tks .....lb.	.13	.14	.13	.14	.13	.14
Tetrachlorethane, 50 gal drs lb.	.08	.08½	.08	.08½	.08½	.09
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl..lb.	.20	.25	.20	.25	.20	.25

‡ Bags 15c lower; ※ + 10.

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Tin Crystals
Zinc Stearate
Prices

	Current Market	1936 Low	1936 High	1935 Low	1935 High
Tin, crystals, 500 lb bbls, wks ..lb.	.36	.36½	.36	.37½	.36	.39½
Metal, NY ..lb.	.47⅜	.47⅜	.48¼	.48⅞	.456	.52½
Oxide, 300 lb bbls, wks lb.	.51	.53	.51	.53	.51	.58
Tetrachloride, 100 lb drs, wks ..lb.	...	.24½	.24½	.24¾	.24¾	.26¾
Titanium Dioxide, 300 lb bbls ..lb.	.17¼	.19¼	.17¼	.19¼	.17¼	.19¼
Barium Pigment, bbls ..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Calcium Pigment, bbls ..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	...	.35
8000 gal tks, frt allowed gal.	...	.30	...	.30	...	.30
Toluidine, mixed, 900 lb drs, wks ..lb.	.27	.28	.27	.28	.27	.28
Toner Lithol, red, bbls ....lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls ..lb.	...	.75	...	.75	...	.75
Toluidine, bgs ..lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks lb.	.32	.36	.32	.36	.32	.36
Triamylamine, drs, wks ..lb.	...	1.25	...	1.25	...	1.25
Trichlorethylene, 50 gal drs lb.	.089	.094	.089	.094	.09½	.10
Triethanolamine, 50 gal drs wks ..lb.	.26	.30	.26	.30	.26	.38
tks, wks ..lb.	...	.25	...	.25	...	...
Tricresyl Phosphate, drs ..lb.	.19	.26	.19	.26	.21	.23
Triphenyl Guanidine ....lb.	.58	.60	.58	.60	.58	.60
Tripoli, airfloated, bgs, wks ..ton	27.50	30.00	27.50	30.00	27.50	30.00
Tungsten, Wolframite per unit	15.00	15.25	15.00	15.25	15.00	15.25
Turpentine (Spirits), c-l, NY dock, bbls ..gal.	...	.42½	.42½	.50	.43¾	.55½
Savannah, bbls ..gal.	...	.37½	.37½	.45	.38¾	.50¼
Jacksonville, bbls ..gal.	...	.37	.37	.44½	.38¾	.50¼
Wood Steam dist, bbls, c-l, NY ..gal.	...	.39	.39	.47	.43	.50
Urea, pure, 112 lb cases ..lb.	.14½	.15½	.14½	.17	.15½	.17
Fert grade, bgs. c.i.f. ..ton c.i.f. S.A. points ..ton	95.00	110.00	95.00	110.00	100.00	120.00
Urea, dom, f.o.b., wks..ton	95.00	110.00	95.00	110.00	...	...
Urea Ammonia liq 55% NH_3, tks ..unit	...	.96	...	.96	...	.96
Valonia beard, 42%, tannin bgs ..ton	60.00	Nom.	60.00	Nom.	40.00	58.00
Cups, 32% tannin, bgs..ton	...	Nom.	...	Nom.	26.00	49.00
Mixture, bark, bgs ..ton	...	Nom.	...	Nom.	...	32.00
Vanilin, ex eugenol, 100 lb tins ..lb.	...	3.75	...	3.75	...	...
Ex-guaiacol ..lb.	...	3.65	...	3.65	...	...
Vermillion, English, kgs ..lb.	1.59	1.61	1.58	1.79	1.48	1.71
Vinyl Chloride, 16 lb cyl ..lb.	...	1.00	..	1.00	...	1.00
Wattle Bark, bgs ..ton	...	29.25	27.50	29.75	29.00	32.00
Extract, 60°, tks, bbls ..lb.	...	.03⅝	...	.03⅝	...	.03¾

WAXES

Wax, Bayberry, bgs ..lb.	.17½	.20	.17½	.20	.17½	.23
Bees, bleached, white 500 lb slabs, cases ..lb.	.36	.38	.34	.38	.33½	.34
Yellow, African, bgs..lb.	.25	.26½	.24	.26½	.21	.25½
Brazilian, bgs ..lb.	.26	.28	.25	.28	.21½	.26½
Chilean, bgs ..lb.	.26	.28	.25	.28	.21½	.26½
Refined, 500 lb slabs, cases ..lb.	.28	.30	.28	.30	.27½	.28
Candelilla, bgs ..lb.	.16	.17½	.16	.17½	.10	.17½
Carnauba, No. 1, yellow, bgs ..lb.	.45	.46½	.45	.48	.35	.54
No. 2, yellow, bgs ..lb.	.44	.45	.44	.46	.34	.51
No. 2, N. C., bgs ..lb.	.40½	.41	.40	.41	.26½	.43½
No. 3, Chalky, bgs ..lb.	.35	.37	.35	.38	.21	.42½
No. 3, N. C., bgs ..lb.	.35	.37	.35	.41	.22½	.43
Ceresin, white, imp, bgs lb.	.43	.45	.43	.45	.43	.45
Yellow, bgs ..lb.	.36	.38	.36	.38	.36	.38
Domestic, bgs ..lb.	.08	.11	.08	.11	.08	.11
Japan, 224 lb cases ..lb.	.08	.08½	.08	.08¾	.06	.09
Montan, crude, bgs ..lb.	.10¾	.11¾	.10¾	.11¾	.10½	.11¾
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.22	.24	.22	.24	.19	.24
Cakes, cases ..lb.	.23	.25	.23	.25	.20	.25
Whiting, prec 200 lb bgs, c-l, wks ..ton	...	15.00	...	15.00	12.00	15.00
Alba, bgs, c-l, wks ..ton	...	15.00	...	15.00	...	15.00
Gliders, bgs, c-l, wks ..ton	11.50	14.50	11.50	15.00	...	15.00
Wood Flour, c-l, bgs ..ton	18.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks ..gal.	...	.33	...	.33	.27	.33
Coml, tks, wks, frt allowed ..gal.	...	.30	...	.30	.26	.30
Xylidine, mixed crude, drs lb.	.36	.37	.36	.37	.36	.37
Zinc, Carbonate tech, bbls, NY ..lb.	.09½	.11	.09½	.11	.09½	.11
Chloride fused, 600 lb drs, wks ..lb.	.04½	.05¾	.04½	.05¾	.04½	.05¾
Gran, 500 lb bbls, wks ..lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks..100 lb.	...	2.00	...	2.00	...	2.00
Cyanade, 100 lb drs ....lb.	.36	.38	.36	.38	.36	.41
Zinc Dust, 500 lb bbls, c-l, delv ..lb.	...	.069	.0685	.069	.057	.0685
Metal, high grade slabs, c-l, NY ..100 lb.	...	5.275	5.22	5.275	4.05	5.22½
E. St. Louis ....100 lb.	...	4.90	4.85	4.90	3.70	4.85
Oxide, Amer, bgs, wks..lb.	.05	.05½	.05	.05½	.05	.06¼
French, 300 lb bbls, wks ..lb.	.05½	.07	.05½	.07	.05½	.10⅞
Palmitate, bbls ..lb.	.22	.23	.22	.23	.21	.23
Perborate, 100 lb drs ...lb.	...	1.25	...	1.25	...	1.25
Peroxide, 100 lb drs ...lb.	...	1.25	...	1.25	...	1.25
Resinate, fused, dark, bbls ..lb.	.05¾	.06½	.05¾	.06½	.05¾	.06½
Stearate, 50 lb bbls ....lb.	.19	.22	.19	.22	.18	.22

Current

Zinc Sulfate
Oil, Whale

		Current Market		1936 Low	1936 High	1935 Low	1935 High
Zinc Sulfate, crys, 400 lb bbl, wks	lb.	.028	.033	.028	.033	.028	.033
Flake, bbls	lb.	.032	.035	.032	.035.	.032	.035
Sulfide, 500 lb bbls, delv	lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
bgs, delv	lb.	.10½	.11½	.10½	.11½	.10½	.11½
Sulfocarbolate, 100 lb kgs	lb.	.24	.25	.24	.25	.24	.25
Zirconium Oxide, Nat kgs	lb.	.02½	.03	.02½	.03	.02½	.03
Pure, kgs	lb.	.45	.50	.45	.50	.45	.50
Semi-refined, kgs	lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

Castor, No. 3, 400 lb bbls.	lb.	.10¼	.10¾	.10¼	.10¾	.09¾	.10¾
Blown, 400 lb bbls	lb.	.12¼	.13	.12¼	.13	.11½	.16
China Wood, bbls spot NY	lb.	.19	.19¼	.14	.19¼	.094	.40
Tks, spot NY	lb.	.1880	.19	.13¾	.19	.088	.35
Coast, tks	lb.	.18	nom.	.132	.18	.087	.24
Coconut, edible, bbls NY	lb.	...	.10¼	...	.10¼	.04	.12
Manila, tks, NY	lb.	...	.04⅝	.04⅝	.05	.03¾	.06¼
Tks, Pacific Coast	lb.	.04¼	.04⅜	.04¼	.04⅞	.03⅜	.06
Cod, Newfoundland, 50 gal bbls	gal.	...	.40	...	.40	.34	.38
Copra, bgs, NY	lb.	.0250	.0255	.0250	.0290	.02	.038
Corn, crude, tks, mills	lb.	.08¼	.08⅜	.08¼	.09½	.08¾	.11
Refd, 375 lb bbls, NY	lb.	.11	.11¼	.11	.12¾	.11½	.14
Cottonseed, see Oils and Fats News Section.							
Degras, American, 50 gal bbls, NY	lb.	.05¼	.06¾	.05¼	.06¾	.04½	.06
English, brown, bbls, NY	lb.	.08¾	.10¼	.08¾	.10¼	.04¾	.06½
Greases, Yellow	lb.	.04⅝	.04¾	.04⅝	.05½	.05	.06¾
White, choice bbls, NY	lb.	.05⅛	.07⅛	.05⅛	.07¾	.05¼	.08½
Herring, Coast, tks	gal.	...	nom.	...	nom.	.23	.33
Lard Oil, edible, prime	lb.	...	.14½	...	.14½	.09¾	.20½
Extra, bbls	lb.	...	.11	...	.11	.08½	.11¾
Extra, No. 1, bbls	lb.	...	.09	...	.09	.08¼	.11
Linseed, Raw, less than 5 bbl lots	lb.	...	.106	.104	.108	.091	.1130
bbls, c-l, spot	lb.	...	.098	...	.10	.083	.102
Tks	lb.	...	.092	...	.094	.0770	.096
Menhaden, tks, Baltimore	gal.	...	.34	.34	.36	.25	.36
Refined, alkali, drs	lb.	.072	.076	.072	.082	.061	.082
Tks	lb.	...	.066	.066	.072	.055	.072
Light pressed, drs	lb.	.066	.07	.066	.076	.055	.076
Tks	lb.	...	.06	.06	.066	.049	.066
Kettle bodied, drs	lb.	...	.093	.093	.096	...	...
Neatsfoot, CT, 20° bbls, NY	lb.	...	.16¾	...	.16¾	.16¼	.16¾
Extra, bbls, NY	lb.	...	.09¼	...	.09¼	.08½	.11¼
Pure, bbls, NY	lb.	...	.12¾	...	.12¾	.11¼	.13¼
Oleo, No. 1, bbls, NY	lb.	...	.11	.11	.12½	.10¾	.14½
No. 2, bbls, NY	lb.	...	.10½	.10½	.12	.10	.13¾
Olive, denat, bbls, NY	gal.	.73	.75	.73	.80	.82	.95
Edible, bbls, NY	gal.	1.60	1.90	1.60	1.90	1.55	1.90
Foots, bbls, NY	lb.	.08⅛	.08¼	.08⅛	.08¾	.07⅛	.10
Oticica, bbls	lb.	.14½	.15½	.11	.15½	.13½	.28
Palm, Kernel, bulk	lb.	...	.049	.04¾	.049	...	...
Niger, cks	lb.	.04⅝	.04¾	.04⅝	.05	.034	.05¾
Sumatra, tks	lb.	.03⅞	.04	.03⅞	.04	...	...
Peanut, crude, bbls, NY	lb.	...	.09	.09	.09¼	...	...
Tks, f.o.b. mill	lb.	...	.08½	.08½	.09⅛	.08¾	.10¾
Refined, bbls, NY	lb.	.12¼	.13¼	.12¼	.13¼	.12½	.14
Perilla, drs, NY	lb.	.07½	.07¾	.07	.07¾	.07¼	.10¼
Tks, Coast	lb.	.072	.074	.066	.074	.068	.08½
Pine, see Pine Oil, Chemical Section.							
Rapeseed, blown, bbls, NY	lb.	.086	.088	.086	.088	.07½	.09
Denatured, drs, NY	gal.	.52½	.53	.52	.56	.40	.56
Red, Distilled, bbls	lb.	.09⅛	.10⅛	.09⅛	.10⅝	.07⅜	.10⅝
Tks	lb.	...	.08¼	.08¼	.08¾	.06½	.08¾
Salmon, Coast, 8000 gal tks	gal.	...	.31	...	.31	.25	.35
Sardine, Pac Coast, tks	gal.	.32	nom.	.32	.39	.24½	.37½
Refined alkali, drs	lb.	.072	.076	.072	.082	.065	.082
Tks	lb.	...	.066	.066	.072	.06	.072
Light pressed, drs	lb.	.066	.07	.066	.076	.055	.076
Tks	lb.	...	.06	.06	.066	.049	.066
Sesame, yellow, dom	lb.	.13½	.14	.13	.14½	.12¼	.15½
White, dos	lb.	.13½	.14	.13	.14½	.12¾	.15½
Soy Bean, crude							
Dom, tks, f.o.b. mills	lb.	...	.08	.08	.085	.08	.10
Crude, drs, NY	lb.	.086	.09	.086	.095	.086	.11
Refd, bbls, NY	lb.	.091	.10	.091	.105	.091	.115
Tks	lb.	.085	.09	.085	.095	.08	.10½
Sperm, 38° CT, bleached, bbls NY	lb.	.094	.096	.094	.101	.099	.101
45° CT, bleached, bbls, NY	lb.	.087	.089	.087	.094	.092	.094
Stearic Acid, double pressed dist bgs	lb.	.09	.10	.09	.11	.10	.12¼
Double pressed saponified bgs	lb.	.09½	.10½	.09½	.11½	.09	.12¾
Triple pressed dist bgs	lb.	.11¾	.12¾	.11¾	.13¾	.12¾	.15¼
Stearine, Oleo, bbls	lb.	.07½	.08	.07½	.09	.09¼	.12½
Tallow City, extra loose	lb.	...	.05⅝	.05⅝	.06⅝	.05⅜	.07⅜
Edible, tierces	lb.	...	.07¼	.07⅝	.08½	.07¼	.09¼
Acidless, tks, NY	lb.	...	.08¾	...	.08¾	.07½	.10¾
Turkey Red, single, bbls	lb.	.08	.08½	.08	.08½	.07½	.08½
Double, bbls	lb.	.13	.13½	.13	.13½	.12½	.13½
Whale:							
Winter bleach, bbls, NY	lb.	.077	.079	.077	.081	.07	.083
Refined, nat, bbls, NY	lb.	.073	.075	.073	.075	.064	.081

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"We"—Editorially Speaking

Our always interesting and informative contemporary, the *Chemical Trade Journal*, of London, comments jocularly upon the recent translation in a Jugoslavian decree on insecticides of the term "carbohydrate" for "hydrocarbon" which was obviously meant in the original. "We," having in "reverse English" recently made the same slip, are sympathetic with the translator; but we did get a hearty chuckle out of the translation of the Italian phrase "alcool butilico terzio" into "Third rate butyl alcohol."

❖❖❖❖

Did you know—

That the man responsible for that borax ski slide at Saks & Company was an old H. J. Baker & Company executive, L. W. Gibbons, now in charge of the Yale University Co-op?

Fifteen Years Ago

From our issues of April, 1921

University of Wisconsin establishes course in manufacturing chemistry.

Offering, by Clark, Dodge & Co., of $3,000,000 eight per cent. cumulative preferred stock of Celluloid Corp., is oversubscribed.

Sixth annual meeting TAPPI held at Waldorf-Astoria, New York.

Armour Fertilizer Works builds sulfuric acid plant at Greensboro, N. C.

Warner D. Huntington, vice-president, Davison Chemical, sails for Europe on business trip.

C. B. De Lore, National Pigments and Chemical, elected president St. Louis Paint and Varnish Club.

Sparks from locomotive cause fire at American Potash plant at Antioch, Nebr.; estimated damage $500,000.

Darco Corp. to build 6,000 ton manufacturing plant to produce decolorizing carbons from lignite used in sugar refining process.

D. H. Litter, Robert Grant, Inc., returns from extended business trip through west, and reports business conditions improving.

Judge Barnes in declaring the Wagner labor relations act unconstitutional certainly said a mouthful when he said "A unilateral agreement."

❖❖❖❖

Thomas Elliott Snyder, Senior Entomologist, Bureau of Entomology and Plant Quarantine, Department of Agriculture, has studied the termite for twenty-six years, and is the author of the book "Our Enemy the Termite." Born in New York City in '85, he received his A.B. degree from Columbia in '07, M.F. from Yale in '09, and Ph.D. from George Washington in '20. He is also an authority on biology; taxonomy; genetics; insects attacking forest products; and the "powder post" beetle.

❖❖❖❖

You probably did not know that Dr. Bueb, the I. G. nitrogen executive, is the author of a work entitled: "A Cookbook for Men Only."

❖❖❖❖

The definition of a synthetic plastic in the article in *Fortune* for March was Gawd awful—quite on a par with the pocket dictionary which informs you: "Sweet; not sour" and "sour; not sweet."

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Eschewing destructive criticism we submit: "A synthetic plastic is an amorphous solid material of chemical origin."

❖❖❖❖

If you can do better, or as well, we will publish your revisions; but we warn you before you start trying that dictionary making is a dog's life.

❖❖❖❖

Several selections from the "Ten Commandments of an Industrial Chemist" published in the *National Council Safety Letter*:

1. Thou shalt be pipe fitter, electrician, glass blower, lead burner, welder, office boy, carpenter and laboratory devil, for the sake of thy process.

3. Six days shalt thou labor with thy process, and the seventh day also. For the Sunday was made for chemists.

4. Thou shalt keep thy process running on Election Day, Fourth of July, Thanksgiving, Christmas, and Columbus Day. For the welfare of the plant thou shalt have no holiday whatever.

Twelve Good Men

What a jury of twelve of the leading paper technologists in America think will be published in a verbatim report of a round table discussion carried on by:

Allen Abrams
F. C. Clark
C. E. Curran
A. E. H. Fair
C. C. Heritage
M. A. Krimmel
W. R. Maull
H. R. Murdock
John Schuber
G. K. Spence
Edwin Sutermeister
John Traquair

5. Thou shalt run thy process without residues, either those that pollute with stenches the air above or those which may be poured into rivers, or those that accumulate as ungodly wastes upon the face of the earth.

6. Thou shalt endeavor by thermodynamics, relativity, soft soap, bull-dozing, profanity, and chemistry, to keep thy efficiencies high,—yes, a hundred per cent. is acceptable.

7. Thou shalt not covet new equipment, or assistants, or foremen. For all these things are abomination in the sight of employers.

9. Thou shalt turn out a product of unexcelled purity, for the sales department knows best.

❖❖❖❖

Quoted from an editorial "We" published in April, 1935: "It has always been recognized that reciprocity business is full of snares and pitfalls. Reciprocity that degenerates to a racket is packed with dynamite."

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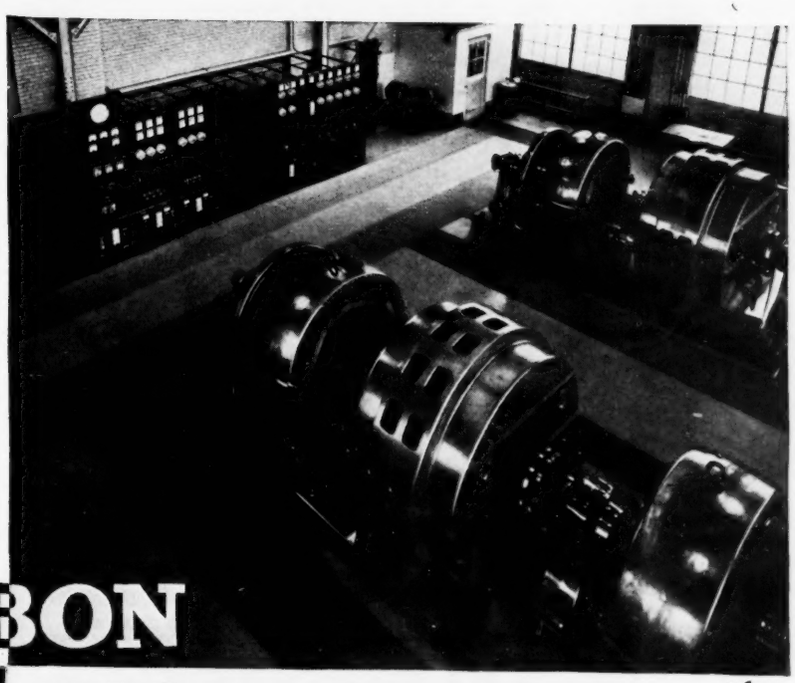
Among the thousand requests for information last month was this: "Are you the publishers of 'The Well of Loneliness'?"



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